1988

The principles of the contracting discipline: an analysis.

Ober, Stephen Courtney.

NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

THE PRINCIPLES OF THE CONTRACTING DISCIPLINE:
AN ANALYSIS

by

Stephen Courtney Ober

June 1988

Thesis Advisor: David V. Lamm

URITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

REPORT SECURITY CLASSIFICATION CLASSIFIED	1b RESTRICTIVE MARKINGS
SECURITY CLASSIFICATION AUTHORITY	3 DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release; distribution is unlimited
DECLASSIFICATION / DOWNGRADING SCHEDULE	
PERFORMING ORGANIZATION REPORT NUMBER(S)	5 MONITORING ORGANIZATION REPORT NUMBER(S)
NAME OF PERFORMING ORGANIZATION val Postgraduate School	6b OFFICE SYMBOL (If applicable) 7a. NAME OF MONITORING ORGANIZATION Naval Postgraduate School
ADDRESS (City, State, and ZIP Code) nterey, California 93943-5000	7b. ADDRESS (City, State, and ZIP Code) Monterey, California 93943-5000
. NAME OF FUNDING / SPONSORING ORGANIZATION	8b. OFFICE SYMBOL (If applicable) 9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
. ADDRESS (City, State, and ZIP Code)	10 SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO / WORK UNIT ACCESSION NO

. TITLE (Include Security Classification)

HE PRINCIPLES OF THE CONTRACTING DISCIPLINE: AN ANALYSIS

. PERSONAL AUTHOR(S)
)ber, Stephen C.

a. TYPE OF REPORT laster's Thesis	13b TIME COVERED FROM _____ TO _____	14. DATE OF REPORT (Year, Month, Day) 1988 June	15 PAGE COUNT 131

. SUPPLEMENTARY NOTATION
he views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

COSATI CODES		
FIELD	GROUP	SUB-GROUP

18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
Contracting Principles, Contracting Science, Contracting Research, Contracting Laws, Contracting Taxonomy.

. ABSTRACT (Continue on reverse if necessary and identify by block number)

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The paper begins with a brief review of the complimentary efforts to date, and presents a general hierarchy of science within which future contracting principles would exist. The research effort present the results of a survey conducted among a group of the contracting discipline's most respected professionals. Each was asked to conduct an independent validation of the candidate principle in terms of the given validation model. Results of this survey are tabulated and analyzed. While no overwhelming consensus as to the candidate principles' validity was obtained, this effort was able to refine and redefine the candidate principles to the extent they should be much more highly susceptible to validation. The writer concludes that principle validation is much closer to realization.

0 DISTRIBUTION / AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT ☐ DTIC USERS	21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED
2a. NAME OF RESPONSIBLE INDIVIDUAL David V. Lamm	22b TELEPHONE (Include Area Code) (408) 646-2775 22c. OFFICE SYMBOL 54Lt

D FORM 1473, 84 MAR 83 APR edition may be used until exhausted. All other editions are obsolete

SECURITY CLASSIFICATION OF THIS PAGE

☆ U.S. Government Printing Office: 1986—606-243

Approved for public release; distribution is unlimited

The Principles of the Contracting Discipline: An Analysis

by

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Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
JUNE 1988

ABSTRACT

This thesis analyzes five candidate contracting principles for their validity and utility to the contracting discipline. The effort is an important cornerstone to the establishment of contracting as a scientific discipline.

The paper begins with a brief review of the complimentary efforts to date, and presents a general hierarchy of science within which future contracting principles would exist. The research effort present the results of a survey conducted among a group of the contracting discipline's most respected professionals. Each was asked to conduct an independent validation of the candidate principle in terms of the given validation model. Results of this survey are tabulated and analyzed. While no overwhelming consensus as to the candidate principles' validity was obtained, this effort was able to refine and redefine the candidate principles to the extent they should be much more highly susceptible to validation. The writer concludes that principle validation is much closer to realization.

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I. INTRODUCTION

A. PROBLEM STATEMENT

Contracts management as it exists today is a dynamic and multi-faceted discipline. Its practitioner faces increasing complexity and regulation within the contracting environment. The professionals in this field are required to draw upon a vast number of skills and talents in exercising their contracts management responsibilities. As the complexity, and the sheer volume of contracting actions have risen in the past four decades, so has the contracting research dealing with its phenomena. As this research has expanded in scope, there has been a corresponding call from both professionals and academicians to establish a more systematic (and hopefully more effective) method of inquiry into the phenomena of the contracting field. As an almost natural outgrowth of this call, there emerged a group who advocated the establishment of a contracting science. {Ref. 2: p. 9}

Those advocating the establishment of a contracting science felt that such an achievement would benefit the discipline in many ways. Among the most significant benefits however, it was felt recognition and acceptance of a contracting science would:

1. expand the scope of research by the academic community into the contracting process and its phenomena;

2. provide greater insight and analysis of the contracting process and its phenomena, which could well lead to the discovery of principles that could be applied by practitioners to enhance their efficiency and effectiveness; and

3. an enhanced degree of professionalism to be exhibited (and required) of all practitioners of the contracting discipline.

It is this second benefit which lies at the heart of establishing a contracting science. Scientists and theoreticians of all disciplines would readily agree that any accepted science has at its base, laws and principles which empirically define the interrelationship and dependence of given phenomena to one another. Laws and principles do not merely exist for a given scientific discipline. Rather what exists are concepts, constructs, underlying regularities and associations of phenomena which must be observed and analyzed by a researcher before they can even be framed in the context of laws or principles. These relationships and associations are typically refined and further analyzed before they are transformed into hypotheses which can be empirically tested. These tests are normally structured in conjunction with a specific scientific model which depicts the hierarchy of these associations, and their relative strength as a tool for prediction.

The thrust of this research effort then is to take the concepts and associations formulated by previous researchers in this field, and analyze them within the context of an appropriate model to determine their validity as higher order

laws and principles. This research effort then becomes a cornerstone in the larger effort to establish a contracting science.

B. OBJECTIVES

The objective of this research is to advance the work of recent studies aimed at identifying principles of contracting. This thesis will attempt to further the work of LCDR Steven A. Park and LT James A. Fawbush, Jr. who have conducted research on contracting as a science and the identification of contracting principles. It was Park, who in the course of his research on the establishment of a contracting science, identified five "candidate" principles of contracting. His work, and the work of others have focused on the application of the essential criteria embodying a structured science, to the contracting discipline. These efforts have been aimed at identifying a contracting body of knowledge, a procurement taxonomy and principles of contracting.

Principles within a scientific discipline, are normally considered to be the rules or laws concerning the functioning of a particular phenomenon. However, a quick reading of the texts on the structure of a science will show that all scientific disciplines incorporate a hierarchy which clearly distinguishes between principles/laws, generalized relationships, and conceptual associations. Models have been developed in the various scientific communities to examine

and scrutinize these "principles" and determine where in the hierarchy they fall. Fawbush's thesis proposed analyzing these candidate principles using a model developed by marketing theorist Shelby D. Hunt. This thesis will use that same Hunt model to scrutinize and evaluate the candidate contracting principles. Additionally this thesis will attempt to validate the candidate principles by presenting them to a much wider field of contracting experts, than had past efforts.

The specific objectives to be pursued in this research effort include:

1. Rigorous analysis of one candidate contracting principle by the researcher, in an attempt to ascertain its validity in terms of the Hunt Model for Laws and Lawlike Statements.

2. Exposure of the Hunt Model and the five candidate principles to a body of over 200 recognized contracting experts representing government, industry and academia.

3. An analysis of each candidate principle in terms of the responses received from the survey.

4. A restructuring of any candidate principle failing the Hunt Model validation process or lacking a general consensus from the surveyed group.

C. RESEARCH QUESTIONS

The following primary research question was addressed in pursuit of the stated objectives:

* **What would result from a rigorous validation of candidate contracting principles?**

In support of the primary research question, the following supplementary research questions were addressed:

1. What is a contracting principle, and what are its key aspects in a scientific context?

2. What is an appropriate validation process under which these candidate contracting principles can be scrutinized?

3. Can a consensus be reached among the professional contracting community as to the viability of candidate contracting principles?

4. Given there is a hierarchy for all generalized conditions, laws and principles; where would these candidate principles lie on this hierarchy?

D. RESEARCH METHODOLOGY

A qualitative research approach was employed which involved a comprehensive literature review, written surveys of a recognized body of contracting experts, application of the scientific method to the candidate principles, and personal observation. Initial research was conducted via a literature review to obtain insight as to how "principles" were defined in a scientific context. Additionally, this review was conducted to identify general hierarchies of science, in order to distinguish the various gradations between general observations and central tenets and laws. Much of the literature review focused on the background and framework for the Hunt Model which was used in the validation process.

The effort to identify one or more valid principles of contracting was two pronged. It began with the researcher selecting one of the candidate principles for rigorous analysis and validation against the Hunt Model for Laws and

Lawlike statements. At the same time, a group of 223 recognized contracting experts, representing industry, government and academia, were selected to participate in a survey on the five candidate principles. This survey presented a synopsis of the Hunt Model and asked participants to evaluate the validity of each candidate principle in terms of the model's criteria. Each candidate principle was accompanied by definitions which were to serve as clarification for key terms and phrases. Respondents were asked to respond in the affirmative or negative as to the principle's validity, and to provide amplifying justification for their stand.

The selection of personnel was made largely from the National Contract Management Association's (NCMA) Council of Fellows, with a lesser number being selected from 30 different colleges and universities offering undergraduate or graduate instruction in the area of acquisition and contracts management. It was felt that the breadth of knowledge and experience represented within this professional group would greatly support a critical review and analysis of these candidate contracting principles. One hundred and eleven respondents participated in this survey for a response rate of almost 50 percent.

E. ASSUMPTIONS, LIMITATIONS, AND SCOPE

Throughout the thesis it was assumed that the reader is somewhat familiar with contracting and procurement

procedures. For the purpose of this research effort, the words acquisition, contracting and procurement are all assumed to be synonymous. That is to say that all three terms are used interchangeably to refer to the process of obtaining goods and services through a contractual instrument.

This research effort limited itself to a rigorous analysis of five candidate contracting principles as presented by Park. The principles were altered only in terms of some of the researcher provided definitions of key phrases and terms. While the researcher recognized the ongoing debate over the utility of the establishment of a contracting science, and arguments as to whether the contracting discipline is art as opposed to a science, this effort chose not to address these issues, as important as they are. Rather the researcher chose to concentrate only on the attributes of a scientific principle, and a validation effort for those identified by Park.

The scope of this thesis involved identifying the key attributes of a scientific principle, and presenting an appropriate model under which these candidate principles could be scrutinized for those key attributes. The thrust of the analysis centered on a survey of 111 recognized experts within the contracting community who were asked to lend their knowledge, experience, and research efforts to critically

analyze and evaluate the five candidate contracting principles.

F. LITERATURE REVIEW

The literature search for this research effort began with the reading of Shelby D. Hunt's Marketing Theory: The Philosophy of Marketing Science. Within this work was Hunt's morphology of laws, which provided the framework for the model which was preselected for use in the candidate principle validation effort. From this book, the researcher was guided to other works such as Abraham Kaplan's The Conduct of Inquiry, Ernest Nagel's The Structure of Science, and Nicholas Rescher's Scientific Explanation. Each of these works provided valuable insight into the nature of laws and principles within the scientific context and served to frame their hierarchy within a given discipline. Bibliographies from the theses efforts of Park, Thornton, and Fawbush also provided a wider array of literature dealing with the nature of scientific principles and their formation, validation and role in any scientific pursuit.

Having established a framework for developing, analyzing and validating principles, the literature review focused on research and general commentary on the nature and effect of competition on the contracting process. In that this was the researcher's selected principle for validation against the Hunt Model, it was determined to be essential to obtain as much empirical evidence and thoughtful analysis on

competition as a driving factor in the effectiveness of contracting actions. Data in the form of empirical studies, professional journal articles and Congressional testimony were obtained in an effort to quantify the impact of competition on contractual actions. This search did not limit itself to Government data or studies, it included an appeal to consultants to the defense industry, as well as that industry itself in an effort to obtain data on the effects of competition in terms of price, quality, and delivery time frames of the end product.

G. ORGANIZATION OF STUDY

The focus of the thesis effort is to determine the validity of the five candidate contracting principles. This chapter provides the standard thesis introduction in which the justification for such an effort is presented along with an outline of the approach. Chapter II provides background information as to the general hierarchy of scientific disciplines and details where principles fit into that hierarchy. This chapter continues with an analysis of the need for a contracting theory and an outline for an approach to conducting a validation of contracting principles. Chapter III presents the model identified by Park and Fawbush as the one most applicable to any effort to establish contracting principles. This Chapter takes each criterion of the Hunt Model and explains the logic and framework upon which they were established. It provides the key for

analysis of the candidate principles. Chapter IV is the researcher's analysis of candidate principle #2. It takes each of the four criterion of the Hunt Model and rigorously analyzes the candidate principle in terms of its ability to satisfy the requirements of generalized conditional, nomic necessity, empirical content and systematic integration. The chapter ends with the researcher's comment and opinion on the candidate principle's validity. Chapter V presents an analysis of the results of the survey of the body of contracting experts. Each candidate principle is analyzed in terms of the responses and comments provided, as well as with the researcher's own analysis of the principle's validity in terms of the chosen model. Revisions for each of the candidate principles, based on survey results are provided at the end of this chapter. Chapter VI presents the researcher's conclusions and recommendations as to where future studies of this sort should aim. It presents several areas for further research which should prove beneficial to such efforts.

II. BACKGROUND

A. INTRODUCTION

The effort to identify and validate principles of contracting is rooted in the broader effort to establish contracting as a science among the social sciences. Establishment of a contracting science would serve to cast a framework for a more systematic and scientific approach to research being conducted in the contracting discipline. Scientific research is necessary to the discovery of underlying uniformities and recurring phenomena, which serve to explain how the variables and elements of a particular observation have interacted to produce a particular outcome or result. Contracting, which would be categorized as an empirical science (with other behavioral and applied sciences) would, as Carl Hempel stated, have two major objectives:

> ...to describe particular phenomena in the world of our experience and to establish general principles by means of which they can be explained and predicted. The explanatory and predictive principles of a scientific discipline are stated in its hypothetical generalizations and its theories; they characterize general patterns or regularities to which individual phenomena conform and by virtue of their occurrence can be systematically anticipated. {Ref. 1: p. 24}

Fawbush in his discussion of the prolific expansion of contracting research in the last twenty years states that: "... experts in both the academic and practitioner

communities {have come} to recognize the need for a more systematic and thus effective approach in the conduct of inquiry respecting the field of contracting." {Ref. 2: p. 1}. This type of research effort is necessary in today's contracting environment, because the contracting manager must base his decisions on an understanding, and knowledge of how contracting variables interact and why they do so. Only through such knowledge will a greater understanding of the phenomena associated with the contracting process come to light. And only with this understanding, can we derive the laws and principles which serve to guide the contracting process, and apply them to improve its efficiency and effectiveness.

B. A GENERAL HIERARCHY OF SCIENCE

A discussion of the significance of underlying principles in a scientific discipline cannot be undertaken until they are put into perspective within the overall hierarchy of science. Robert G. Murdick presents one of the better hierarchical models in terms of its simplicity and general applicability to all empirical sciences. His "building blocks" of science are structured thusly: {Ref. 3: p. 8}

1. Facts, observations, experiences, data
2. Concepts, constructs
3. Hypotheses
4. Principles, laws
5. Theory

These five blocks are tied together through the research process, which serves to further man's knowledge in that scientific field. A brief description of each of the elements of the hierarchy will serve to differentiate them and distinguish their relation to the research process.

1. Facts, Observations, Experiences, Data

A fact is defined as that which exists. Facts arise from observations and other sensory experiences. A fact can be a situation, a state of affairs, or a true phenomenon. However, facts can be tinged with personal interpretation bias and thus facts are classified as such, only if they can be generally agreed upon by the observers. Data refer to a collection of facts. According to Murdick, facts or data may be collected in the research process by: {Ref. 3: p. 8}

1. Direct observation or sensing of natural phenomena or of experimental results.
2. Direct inference from other data which are directly observed.
3. Original documents.
4. Reports and publications of fact gathering agencies and researchers.
5. Questioning of individuals.

Murdick cautions that facts and data are susceptible to error depending on whether they originate from primary or secondary sources, whether they were based on sensory errors or indiscriminate interpretation, or whether they were subject to errors in recording, manipulating or interpreting by the researcher.

2. Concepts, Constructs

Concepts according to Murdick are the departure point for experimentation and testing in the developing science. "Concepts represent new ideas, new meanings, and new creations of explanations." {Ref. 3: p. 9} Concepts are abstract representations of reality. They are formed from the observations and experiences. Concepts do not necessarily equate to phenomena. According to Paul Rigby:

> Concepts are inventions of the human mind to provide a means of organizing and understanding observations. They are not discoveries. The concept of price, credit, debit, and employee were not discovered anymore than were such things as automobiles, accounting techniques, or assembly line balancing methods. We may discover items in the environment to which we attach concepts, but we do not perceive the concepts. We invent them. {Ref. 4: p. 15}

New concepts are formed by an inductive process which begins with the observation of phenomena. A scientist will observe the similarities, differences and irregularities among a group of objects or events he is studying. He then categorizes these objects or events by these characteristics and distinguishes between groups. It is this distinction process which leads to the birth of concepts. Construct as defined by Murdick is merely a concept derived from lower level concepts.

3. Hypotheses

An hypothesis is a proposition or conjecture which has yet to be tested. It represents a tentative solution of a problem or a provisional explanation of a phenomenon. It

provides the structure for research in its final stages. It is a type of specific concept, or can be a small portion of a complex concept. The hypothesis is stated as a proposition so that it can be tested by rules of logic and by comparison with empirical data. An hypothesis is useful in that it makes a statement which can be tested and subjected to retesting and checking by any other researcher who desires to validate or challenge it. It narrows down the research and the argument to a clear specific statement.

> The hypothesis may be subjected to varying degrees of confirmation, and in the business world the statement of the hypothesis, and relatively fragmentary evidence may often prove to be a very useful solution to a problem. {Ref. 3: p. 12}

An hypothesis which has been tested becomes part of the body of knowledge making up science, or a solution to an applied problem.

4. Laws, Principles

Laws and principles are generally recognized as hypotheses which have been tested, and which describe invariable relationships among phenomena in a particular field of study. A distinction should be made, however, between a law and a principle, as there is still some controversy in the scientific community as to the definitions and relative hierarchy of the two terms. Borrowing again from Murdick; "a law is considered to be a well-verified hypothesis and asserts an invariable association among variables." {Ref. 3: p. 13} The association can be

probabilistic or deterministic in nature. Laws can be classified as either empirical or theoretical. Empirical laws are generally derived from observations of phenomena or controlled experiments. A theoretical law is a statement of relationships based upon other laws, premises or assumptions. Murdick distinguishes principles from laws by stating a principle to be a fundamental or primary law which includes direction for action to be taken.

> A principle can be defined as a fundamental statement or general truth providing a guide to thought or action. The fundamental statement applies to a series of phenomena under consideration and signifies what results to expect when the principle is applied. {Ref. 5: p. 6}

Laws then, assert the invariable relationships among variables, while principles are those laws which are useful to the practitioners.

5. Theory

A theory is a system of explanation which is built and supported by a combination of laws and facts. Like laws, they are susceptible to testing, modification, and rejection at all times. According to Talcott Parsons:

> Theory....in the scientific sense, consists in a logically integrated set of propositions about the relations of variables, that is, abstract conceptual entities, in terms of which many statements of fact can be systematically related to each other and their meaning for the solution of empirical problems interpreted. Besides all the important empirical relevance, the principal criteria of good theory are conceptual clarity and precision and logical integration in the sense not only of the logical compatibility of the various propositions included in a theoretical scheme, but of their mutual support, so that inference from one part of the scheme to other parts becomes possible. {Ref. 6: p. 137}

C. THE NEED FOR A CONTRACTING THEORY

The development of a contracting theory is essential to the establishment of an overall philosophy of contracting science. The growth of contracting as a necessary means for obtaining goods and services in this industrial society has been phenomenal. As the number of contracting actions has grown, so have their frequency and complexity. Systematic procurement research is sorely needed to help explain the intricacies and interrelationships of the many variables that attend the contracting process. The search to identify and validate contracting principles is one such effort. Success in such an effort would provide the foundation for an understanding of the phenomena which interact to produce an explainable and predictable reaction or outcome. A knowledge and understanding of these phenomena would provide the practitioner with a solid framework within which to conduct a more effective and efficient contracting process.

D. THE APPROACH TO VALIDATING PRINCIPLES

As stated in Chapter I, this research effort was designed to build on the research conducted by Park and Fawbush in their attempts to identify principles of contracting. Park asserted that the identification of underlying uniformities and regularities among the phenomena that comprise the contracting process, was a key requirement to be met before science status could be conferred on the contracting discipline. He contended that if contracting principles did

in fact exist, then the underlying uniformities and regularities on which these principles were based could also be identified. His efforts included interviews with eleven prominent individuals in the contracting community, practitioners and academicians alike. These interviews elicited concepts which Park then analyzed in terms of their potential for classification as candidate principles. From this effort he identified five candidate contracting principles. Fawbush then took those five candidate principles and devised a conceptual framework for their validation, as well as for the identification of other contracting principles. Fawbush's work outlines several research design methodologies that allow for the exploration and analysis of elemental aspects of lawlike propositions dealing with contracting phenomena.

This research effort will take one of the five candidate contracting principles and rigorously attempt to validate it through faithful application of the research design methodology supported by Fawbush. The model used for this validation will be that developed by Shelby D. Hunt, Marketing Theorist and Professor of Marketing at Texas Tech University. Hunt's model for the morphology of scientific law appears in his book Marketing Theory: The Philosophy of Marketing Science. As with the Park and Fawbush theses, literature on the science of marketing was relied upon heavily because of the many parallels which exist between

this discipline and that of contracting. Hunt's model in this particular book evolves from his extensive treatment of the nature and function of laws in marketing science.

Hunt's criterion for a law was applied rigorously to only one of the five candidate principles in the validation effort. It was also used to evaluate the four remaining candidate principles in terms of how they might fare in an initial validation assessment with the model. Complimenting this effort, the researcher surveyed over 200 prominent experts within the contracting profession. This group, comprising National Contract Management Association (NCMA) Fellows and contracting faculty from various colleges and universities, was asked to assess each of the five candidate principles within the context of the Hunt model, and indicate whether or not they felt the candidate principle to be valid. Each respondent was asked to elaborate on his/her stand regarding the candidate principle's validity, in an effort to obtain feedback on the concepts, terms, and wording which either captured or failed to capture the invariable association of the phenomena hypothesized. The survey's purpose was to determine whether a consensus could be obtained from the recognized experts of the contracting discipline, as to a valid contracting principle. Consensus implies agreement in definition or interpretation, and greatly compliments the empirical studies which support the hypothesis.

E. SUMMARY

This chapter has examined the practical need for procurement research within today's contracting environment. It has developed a preliminary outline of the general structure of science in an effort to put scientific principles in the context of some understandable hierarchy. This general structure will be built upon in subsequent chapters as the five candidate principles are scrutinized using the criteria from the Hunt model. Finally this chapter discussed the need for the discovery of underlying uniformities and regularities which drive the contracting process, and how their identification will aid in validating candidate contracting principles.

III. THE VALIDATION MODEL

A. INTRODUCTION

Professor Shelby D. Hunt, Marketing Theorist, and author of Marketing Theory: The Philosophy of Marketing Science, presents an excellent treatise on the role of laws and lawlike statements in marketing inquiry. To Hunt, "the development of laws in marketing is an absolute requirement for explaining marketing phenomena." {Ref. 7: p. 156} Hunt also argued that lawlike statements facilitate the prediction of marketing phenomena. This combination of explanatory power and the ability to predict lead to the scientific understanding and control of phenomena. Hunt states that all scientific principle models that provide adequate scientific explanation of past marketing phenomena must also "be potentially capable of predicting future marketing phenomena." {Ref. 7: p. 156} The laws which are incorporated into these models provide the predictive power.

Because many parallels exist between marketing and contracting, the Hunt Model for Laws and Lawlike Statements appeared readily adaptable to the contracting inquiry. In that many of the principles of marketing are founded on phenomena which are influenced and shaped by factors of the environment, including human behavior, it was felt that this model would serve effectively in scrutinizing the candidate

contracting principles. Hunt's Model of Laws and Lawlike Statements incorporates four criteria, all of which if satisfied, corroborate a law within the scientific context. It is the goal of all scientific endeavor to identify and employ certain laws in an attempt to predict the consequences of altered actions or resources employed. With this ability to predict consequences, there arises an ability to control, at least to some extent the outcome of a particular situation.

> Thus the intellectual goal of all scientific endeavor is scientific understanding, and the pragmatic consequence of scientific endeavor is increased control over man's environment. {Ref.7: p. 157}

B. CRITERION ONE: GENERALIZED CONDITIONALS

Hunt's first criterion in the Laws and Lawlike Statements Model (herein referred to as the Hunt Model) is that all laws specify a relationship in the form of a generalized conditional. A conditional statement can take on many forms including that of an "if-then" relationship. Other variations include statements such as "for every occurrence of A, there will be an associated occurrence of B" or "all A are B". According to Hunt "Lawlike generalizations (or lawlike statements or lawlike propositions) are statements in generalized conditional form which fulfill all the criteria of laws, but have not yet been tested or corroborated." {Ref. 7: p. 157} Hunt distinguishes between corroboration of a lawlike statement and saying that it is true. He states that

while lawlike statements can be proven false, none can be proven true. The notion true implies a certitude that simply is not possible for statements of lawlike form. Hunt's argument counters that of scientific theorist Carl G. Hempel who offered that only true statements could be laws. Hunt asserts that lawlike statements need not be proven true, but only supported by the evidence. This evidence says Hunt, confers varying degrees of likelihood that the statement is true. He stipulates that because corroboration and general acceptance have become synonymous, there are no explicit guidelines as to how much empirical support is needed for a statement to become law.

Hunt makes an additional distinction between a law and a principle. While recognizing that the distinction is largely honorific, Hunt asserts that principles are higher order laws, which are thought to be of extreme importance to that discipline. He also suggests that principles have a much greater amount of corroborating evidence supporting them, than do laws.

C. CRITERION TWO: EMPIRICAL CONTENT

The second criterion of the Hunt Model states that all generalized conditionals (lawlike statements) must have empirical content. "The empirical content criterion rules out both nonsense statements and strictly analytical statements." {Ref. 7: p. 158} Nonsense statements are just that--generalized conditionals which pretend to portray an

if-then association between two phenomena, where one or both of the phenomena is purely fictional or so generally defined as to be capable of being regarded as true in any context or discipline.

A purely analytic statement is one which is true because it lacks an assertion of real world facts. For example to say that either quality control activities represent one of the single largest investments in manhours in the contract administration effort or quality control activities do not represent one of the largest investments in manhours in the contract administration effort, makes no assertion about the real world, it says nothing at all. This type purely analytical statement is a tautology. On the other hand this sample statement could easily be revised to make it a synthetic statement, i.e., a true statement, corroborated by evidence, which makes an assertion about the real world. The revision could simply state that quality control activities represent one of the largest single investments in manhours in the contract administration effort. Lawlike statements must be empirically testable, and this revision could certainly be tested through random sampling of the contract administration manhours spent on quality control activities.

Hunt states that purely analytic statements are true only because of the order and nature of the logical terms, and the way in which descriptive terms are defined. Term definition was a subject of careful review in this research effort as

the researcher tried to clearly delineate the factors comprising the two phenomena in the generalized conditional. Were this not the case, it was felt that the lack of consensus on definitions of key terms (or contracting's lack of a recognized lexicon) would raise great confusion and disagreement over the principle's validity, and whether or not they were mere analytic statements which applied equally well to any discipline. The intent was to avoid overt generalisms that would be of little or no value in developing a contracting theory.

D. CRITERION THREE: NOMIC NECESSITY

Hunt's third criterion states that lawlike statements must possess nomic necessity. Nomic necessity in simplest terms requires that the occurrence of one phenomenon be associated with another phenomenon, the relationship cannot merely be happenstance. This particular criterion is designed to ferret out those accidental generalizations which are purported to be laws.

> The classic illustration of an accidental generalization has been provided by Nagel: 'All the screws in Smith's current car are rusty'.... The statement is a generalized conditional with empirical content. Nevertheless, few people would like to accord lawlike status to such a generalization precisely because it somehow seems to describe an accidental relationship. {Ref. 7: p. 161}

Hunt contends that the accidental generalization can be weeded out and the premise of its statements shown to be not true. This is done through the establishment of what Hunt calls counterfactual conditionals. As an example, taking

Nagel's classic: "All the screws in Smith's current car are rusty" {Ref. 8: p. 102}, could be reconstructed to state, "If this car were Smith's (which it is not) then all the screws would be rusty." Here the premise is counter to the facts. The statement that all the screws in Smith's current car are rusty, does not give the reasonably intuitive person cause to believe that any car which is Smith's current car has rusty screws throughout. By the same token, if the generalized conditional were in fact true (every screw in Smith's current car is rusty) no rational person would say that this would apply to any car that Smith could currently own. The major purpose of scientific laws are to explain and predict phenomena. An accidental generalization will not do that. This is evidenced by their inability to support counterfactual conditionals.

E. CRITERION FOUR: SYSTEMICALLY INTEGRATED

Hunt's fourth and final criterion states that "all purportedly lawlike statements must be integrated into a body of scientific knowledge." {Ref. 7: p. 163} Stated in this manner, a simple empirical regularity would not be considered a lawlike statement unless it were systematically integrated into the structure of the discipline. Hunt defines empirical regularities as statements which summarize observed uniformities in the relationship between two concepts. He cites Nicholas Rescher's argument that empirical generalizations cannot be considered law because:

> ....a law is not just a summary statement of observed regularities to date; it claims to deal with a universal regularity purporting to describe how things inevitably are; how the process at work in the world must invariably work; how things have to happen in nature. Such a claim has to be based upon a stronger foundation than any mere observed regularity to date. {Ref. 7: p. 163}

Generalized observations fail as laws in that they do not clearly explain and define the mechanisms by which natural processes or phenomena occur. The requirement for relationships to be systematically integrated ensures that the focus is on the scientific explanation for the phenomena and not merely their prediction. In other words, the relationship must answer the why questions and not simply predict the occurrence of a phenomenon.

F. SUMMARY

This chapter has outlined the four criterion for laws and lawlike statements according to Marketing Theorist, Shelby D. Hunt. This model will be used to rigorously examine and attempt to validate, Park's candidate principle number 2 which states: "If competition within a contracting action is missing, then a less effective contracting action is possible." {Ref. 9: p. 112}

To summarize the Hunt model: in order for a hypothesis to be a lawlike statement it must:

1. be a generalized conditional;
2. have empirical content;
3. exhibit nomic necessity; and

4. be systematically integrated into a body of scientific knowledge.

The empirical content criterion excludes strictly analytical statements, tautologies and nonsense generalizations from consideration. The nomic necessity criterion is meant to exclude accidental generalizations which do not support the invariable association which is not merely happenstance. And the systematically integrated criterion allows for the differentiation between lawlike statements and strictly empirical regularities.

Hunt states that lawlike statements are conferred the status of laws when a substantial body of corroborative evidence has been developed. He further states that a law becomes a principle when the evidence corroborating it is overwhelming, and that law is held to be of extreme significance to the scholars of that discipline.

IV. COMPETITION AS A CANDIDATE CONTRACTING PRINCIPLE

A. INTRODUCTION

Park's candidate contracting principle #2 hypothesized that "If competition within a contracting action is missing, then a less effective contracting action is possible." {Ref. 9: p. 112} This candidate principle was chosen by the researcher for rigorous analysis and validation against the Hunt Model for Laws and Lawlike Statements. This candidate principle was scrutinized as to the degree with which it meets each of the four criteria stipulated by Hunt for laws and lawlike statements.

This particular candidate principle was chosen because of the recent and ongoing efforts to increase competitive procurement within the Federal Government. With the passage of Public Law 98-369, the Competition in Contracting Act (CICA) of 1984, came a new era for Federal Government contracting processes and procedures. The Act made substantive changes regarding the essential nature of the Government contracting system. This law, legislated in great detail, a number of new administrative requirements in the Federal procurement process which were ultimately designed to increase the number of competitively awarded procurements. This legislation was not without its critics, and there are those who have said that "there is no place [in CICA] where

seeking competition is coupled with the objectives of cost savings, innovation, schedule benefits, or economy and efficiency." {Ref. 10: p. 134} This type of criticism led the researcher to wonder if this statute may not have encouraged competition for competition's sake, without regard to its other effects on the effectiveness of the contracting action.

The true question which lies at the heart of any effort to validate this candidate contracting principle, is whether or not competition enhances the contracting action and fosters a more effective contract. A careful reading of Park's research effort reveals that he defined competition as two or more sources actively vying for the contract, and being compared by the buyer on multiple criteria including cost, quality, technical approach, innovation, and schedule. Both Park and the researcher defined a less effective contracting action as one which might be more expensive, suffer cost growth, experience quality, technical and schedule problems, and which would likely be a greater contract administration burden to the buyer. In essence, what Park was alluding to in candidate principle # 2 was that competition provides the buyer not only cost reductions, but also equal or greater quality, innovation, technical and management approach, and contractor efficiency. This then is the hypothesis of candidate principle #2.

An additional reason for the researcher's choice of this candidate principle for validation was that empirical studies done on the costs and benefits of procurement competition were thought to be readily available and particularly useful in assessing the two Hunt criteria of empirical content and nomic necessity.

B. CRITERION ONE VALIDATION: GENERALIZED CONDITIONAL

Criterion one of the Hunt Model requires that all laws specify a relationship in the form of a generalized conditional. Candidate principle #2 appears at first glance to meet this criterion. The association between the lack of competition in the contracting action, and the resulting less effective contracting action is stated in the form of an "if-then" conditional. It does not appear at this stage to be the accidental type generalization of which Hunt cautions. While mere pronouncements by prominent individuals concerning invariably associated phenomena do not a principle make, there is something to be said for the large numbers of prominent and influential people who espouse competition as an exercise with great merit. For example, in 1981, Deputy Secretary of Defense Frank C. Carlucci stated that:

> We believe competition reduces the cost of needed supplies and services, improves contractor performance, helps to combat rising costs, increases the industrial base, and ensures fairness of opportunity for award of Government contracts. {Ref. 11}

Rear Admiral Stuart Platt, the U.S. Navy's first Competition Advocate General, in testimony before the Defense Acquisition

Policy Subcommittee of The Senate Committee on Armed Services, stated in October 1985 that:

> Competition should motivate our defense firms to trim corporate "fat" and invest in productivity enhancements which should improve the posture of American industry in the increasingly competitive world marketplace....the Navy reemphasized competition not for competition's sake, but for the lower price, higher quality and strong industrial base which it provides. {Ref. 12: p. 3}

And there was Senator William V. Roth, Jr., chairing a Governmental Affairs Committee meeting on Competition in The Federal Procurement Process, who in June 1982 stated:

> Competition in the marketplace is a touchstone of the free enterprise system. Effective competition reduces the cost of goods and services, increases the number of goods available by encouraging more businesses, especially small businesses to compete and improve product reliability. Real competition in the private sector also means better management and more efficient business operations as companies will do all they can to avoid unnecessary cost and waste. {Ref. 13: p. 1}

The above excerpts are but a few examples of the generally accepted association of the two phenomena "presence of competition" and "effective contracting actions." Accidental generalizations as defined by Hunt, may have the power to predict, but lack the power to explain. In the case of candidate principle #2, it can and has been shown that the introduction of a competitive strategy into one or more phases of the acquisition cycle can predictably produce certain benefits for the buyer which would make for a more effective contracting action. These benefits often appear in the form of unit price reductions, shortened procurement leadtimes, increased quality and reliability, and increased

contractor efficiency. (Studies relating to these achieved benefits are addressed later in this chapter.) More important however, is the fact that these predicted benefits can be explained. The competition strategy, even before it is put into action, can be shown to cause incumbent suppliers to "sharpen both pencils and quality focus of their efforts" {Ref.14: p. 1} Many behavioral science studies have focused on the effects of competition in both human and athletic endeavor, showing that competition brings out a certain commitment and pursuit of personal excellence for those who choose to compete. Why should the outcome be any different for two firms competing for a contract, the researcher would ask? Competition in an economic sense, has been cited in many studies as one of the key factors in forcing firms to adopt the most efficient production techniques, and to undertake long term planning and investments to reduce costs and increase quality.

Thus competition as a phenomenon, appears useful in predicting and explaining the effectiveness of a contracting action. Therefore, it would appear to have met Hunt's first criterion of specifying a relationship in the form of a generalized conditional, which is not merely an accidental generalization.

C. CRITERION TWO VALIDATION: EMPIRICAL CONTENT

Hunt's second criterion states that all lawlike statements have empirical content. As previously stated,

this criterion is intended to rule out nonsense statements and purely analytic statements. Candidate principle #2 does not appear to be a nonsense statement in that it presents two definable and existent phenomena: "competition within a contracting action" and "a less effective contracting action". This criterion is also designed to exclude purely analytic statements, i.e., those statements that make no assertion about the real nature of things and which make no assertion about the real world. In this respect, candidate principle #2 suffers slightly in that it states that a less effective contracting action is "possible". In the pure meaning of the word "possible", this statement says that a less effective contracting action may result or may even be likely. It does not say that it is likely or is probable. The statement could then be likened to a tautology in that "anything is possible". By use of the word possible, this statement can be easily likened to Hunt's example of the purely analytic statement "either marketing activities consume a large portion of the consumer's dollar, or marketing activities do not consume a large portion of the consumer's dollar". {Ref. 7: p. 159} Use of the word "possible" weakens the empirical content of this candidate principle because it presents an association of two phenomena which produces a possible vice probable or likely result.

An additional element of this criterion is that lawlike statements must be empirically testable. As Kaplan states in The Conduct of Inquiry:

> If science is to tell us anything about the world, if it is to be of any use in our dealings with the world, it must somewhere contain empirical elements....For it is by experience alone that information about the world is received....What knowledge requires of experience, and what experience provides, is an independence of our mere think-so... Science itself is a social enterprise in which data are shared, ideas exchanged, and experiments replicated. It is precisely the cumulation of empirical evidence which shapes a welter of diverse opinions into scientific knowledge common to many minds. {Ref. 15: p. 81}

Thus for a lawlike statement to be considered as having empirical content, as Hunt requires, then the proposition or hypothesis must be capable of being brought into relation with experience as a test of its truth. Candidate principle #2 stumbles on this criterion in one important respect-it fails to quantify or delineate what is meant by "less effective contracting actions". A measurement scale for "effectiveness" is not contained within the hypothesis. Nonetheless it is important to review some of the factors arising, which could be construed as contributing to a less effective contracting action. Examples of these factors would include: cost overruns, fewer economies, late deliveries, lessened innovation, less efficiency, and increased administrative burden. The criterion for being empirically testable could however, be more readily applied if this candidate principle were broken down into several

principles with the "then" portion of the proposition stating:

1. ...then cost overruns on the contract are probable.
2. ...then fewer economies in the contracting action can be expected.
3. ...then late deliveries in the contract are probable.
4. ...then less innovation is probable from the sole source producer.
5. ...then less efficiency from the original producer in the contracting action is probable.

and so on. These statements would then be empirically testable if appropriate and consistent standards were used to measure competed and non-competed contracting actions for identical items or services.

As with "less effective contracting action", a clearer definition of "competition within the contracting action" is required. This portion of the hypothesis makes no allusion to the type of competition suggested (price, technical, schedule, quality, etc..), or during which phase of the contracting action competition is introduced (proposal phase, design phase, production phase etc). Additionally, the statement leaves open the type of contract being competed. It does not cite whether the contract is for research and development, production, construction, professional services, or any other similar item/service.

The types of competition are numerous, and each is introduced into a contracting action to elicit certain "effectiveness" enhancements on the immediate contract. For

example, a price competition is normally established to obtain the lowest unit price. Design competition may be established to obtain the greatest reliability, maintainability, and supportability. Technical competition may attempt to identify the source with the best technical approach. Additionally, the phase that a contractual action is in, or entering, will have a bearing on the type of competition to be introduced, to say nothing of its feasibility or appropriateness.

Given the broad range of factors which make up the decision to compete a requirement, and the uniqueness and peculiarities of each of the various contracts, it appears ill advised to try to broadly stipulate that competition will usually/probably/possibly result in a more effective contracting action. Therefore in the opinion of the researcher, candidate principle #2 as currently written does not fully meet Hunt's criteria for empirical content. As will be noted in subsequent portions of this Chapter, candidate principle #2 needs revision not only to incorporate some measurable amount of probability, but it also requires a redefining of the term competition to incorporate a recognition that it can be improperly applied or inappropriately withheld to produce a less effective contracting action. A proposed revision to this candidate principle is provided at the end of this Chapter.

D. CRITERION THREE VALIDATION: NOMIC NECESSITY

Hunt's third criterion for nomic necessity excludes accidental generalizations from being considered laws. That is to say, the occurrence of one phenomenon must be associated with the occurrence of another phenomenon, and the relationship cannot merely be by chance. In the development of this criterion, Hunt borrows from Nicholas Rescher who states that:

> Lawfulness manifests itself in two related ways: nomic necessity and hypothetical force. Nomic necessity introduces the element of must, of inevitability. In asserting it as a law that 'all A's are B's' (All timber wolves are carnivorous) we claim that the world being as it is, it is necessary that an A must be a B (i.e., that a timber wolf will under appropriate circumstances unfailingly develop as a meat eating animal). {Ref. 16: p. 98}

Rescher goes on to say that nomic necessity is seen most clearly in the context of hypothetical suppositions, especially in what he calls the counterfactual hypothesis. Here Rescher's argument states if we are to accept as law, the statement that all water freezes at 32 degrees fahrenheit, then we would have to be prepared to accept the counterfactual conditional: "If this isopropyl alcohol were water, which it isn't, it would freeze at 32 degrees fahrenheit." In this case you have an element of hypothetical force that makes this statement a lawful generalization and not an accidental generalization. The accidental generalization is best illustrated through the following example: "all the coins in my pocket are quarters"

(all A are B). If this statement is in fact a lawful generalization, then we must accept the counterfactual hypothesis which states that "If this dime were in my pocket, which it isn't, it would then be a quarter" (If x were an A, then x would be a B). While extreme, this example highlights the accidental or perhaps coincidental association of two phenomena, which is merely happenstance. The reasonable observer will readily dismiss any association between my pocket and its ability to transform other coin denominations into quarters.

Applying the above logic to candidate principle #2, one could transform the basic hypothesis into a counterfactual hypothesis thusly: "If X were a non-competed contracting action (A), which it isn't, then a less effective contracting action (B) would be possible/probable." The basic transformation seems to rule out the possibility that a non-competitive contracting action can be an effective contracting action. If candidate principle #2 is in fact a lawful generalization then it would contain the hypothetical power to support the counterfactual conditional. Nomic necessity requires an element of must between the phenomena, therefore it must be determined (from candidate principle #2) if competition in the contracting action <u>has to</u> be present in order to enhance the probability/possibility of a more effective contracting action. In other words, nomic necessity as defined by Hunt and Nagel would require that

non-competitive contracting actions would neither probably or possibly result in a more effective contracting action. The must element of a lawful generalization stipulates that only competed actions are probable or possible causal factors in an effective contracting action.

To counter this argument in real world terms, one need only envision the price competition held for an end item or service in which two well known suppliers are vying for the immediate contract. Assume that Supplier A has a longstanding reputation for meeting schedule and quality requirements. His reputation for service, integrity, and dependability are well established. He however, tends to have slightly higher prices for his goods and services than Supplier B. Supplier B, on the other hand is one who is considered marginal in terms of quality, meeting schedule, and general customer service/orientation. Previous experience indicates that a contract with his firm will impose a greater contract administration burden on the buyer in areas ranging from billing to inspection and delivery. His prices for the goods and services he provides however, typically undercut the nearest competitor by 5%. Given this scenario, it becomes relatively easy to project the outcome of this price competition. A reasonable person would be hard pressed to conclude that competition within this contracting action made for a more effective contracting action. Suppose also, in the same vein, that the aforementioned scenario

still applies, but assume further that A and B are the only two suppliers of the service or good sought. (It could also be assumed that price was not an overriding concern, and competition of the contract was not mandated in any way.) Would not this same reasonable person choose not to compete this contract and go with Supplier A? If said person contracted with Supplier A, would not this contracting action be regarded as more effective than in the previous instance, where price competition brought him Supplier B?

E. CRITERION FOUR VALIDATION: SYSTEMICALLY INTEGRATED

Hunt's fourth and final criterion states that "all purportedly lawlike statements must be systematically integrated into a body of scientific knowledge." {Ref. 7: p. 163} Stated in another manner, a simple empirical regularity is not accorded lawlike status until it is systematically integrated into a coherent scientific framework or structure. An empirical regularity is defined as a statement which summarizes observed uniformities of relationships between two or more concepts or variables. Philosophers of science and theoreticians such as Lambert, Brittan, Kaplan, and Rescher have all held that empirical regularities cannot be classified as lawlike generalizations until they have been systematically integrated into a scientific framework. Rescher defines this systematic integration thusly:

> An empirical generalization is not to be viewed as fully adequate for explanatory purposes until it can lay claim to the status of a law. Now a law is not just a summary

> statement of observed regularities-to-date; it claims to deal with a universal regularity purporting to describe how things are; how the processes at work in the world must invariably work, how things have to happen in nature. Such a claim has to be based upon a stronger foundation than any mere observed regularity-to-date. The coherence of laws in patterns that illuminate the "mechanisms" by which natural processes occur is a critical element-perhaps the most important one in furnishing this stronger foundation, this "something more" than a generalization of observations. An "observed regularity" does not become a "law of nature" simply by becoming better established through observation in additional cases; what is needed is integration into the scientific body of knowledge.
> {Ref. 16: pp. 15-16}

Candidate principle #2 must then be examined in terms of its distinction as a universal regularity purporting to describe how things inevitably are. Is it thus inevitable that the withholding of competition from a contracting action will invariably result in a less effective contracting action? The answer is no if one accepts the candidate principle as worded, for it merely establishes that this lessened effectiveness of the contracting action is possible or probable. Does it have to happen that a less effective contracting action arises because competition within that action was missing? Again the answer is no because it does not have to happen; it is only possible or probable that it will happen. Going just one step further and definitizing the probability by stating that a less effective contracting action will result still fails to satisfy the invariable association of how competition must work. Referring back to the example of Suppliers A and B vying for a price competed

contract, it can be seen how competition can variably work, by producing a less effective contracting action.

As to the scientific body of knowledge into which this principle must be systematically integrated, the contracting discipline has yet to define and designate such a body of knowledge. In her thesis entitled Contracting: A Systematic Body of Knowledge, Connie L. Thornton provides a generic description of a body of knowledge thusly:

> A body of knowledge is a conceptual framework that is systematized about a central theme and formulated through the process of definition, classification, and analysis, with reference to the discovery of general concepts, theories, laws and/or principles. The body of knowledge establishes a synergistic alliance among the participants (denoting a common sense of agreement) associated with the central theme which continually evolves through the process of dynamic progression. {Ref. 17: p. 30}

Were candidate principle #2 incorporated into this scientific body of knowledge (given that it has yet to be defined) one would expect to find a consensus among the experts in the field as to its central importance and validity in conducting the contracting process. However, as will be noted in the following chapter, candidate principle #2 greatly divided the field of experts as to its impact on the effectiveness of the contracting action.

F. INDEPENDENT ANALYSIS

Removing candidate principle #2 from under the Hunt Model microscope, one should again read this generalized conditional to identify the relationship of the phenomena it purports to associate. Put simply, the candidate principle

seems to state that competition in a contracting action generally leads to a more effective contracting action. If such a statement were to be accorded lawlike status (Hunt Model aside), then many philosophers of science, including Recsher would argue that it would have to be embedded in a causal explanation. That is to say, it would have to be clearly shown that in all instances where competition is introduced, there will invariably result, a more effective contracting action. Competition as an element of the contracting action would have to be shown to be a causal agent in the generation of an effective contracting action. In general, however, the situation is much more complex; there are a multiplicity of factors which are operative which can and do promote effective contracting actions. Rescher cites the example of a bankrupt manufacturing firm, whose bankruptcy could have been brought on by a number of factors including a drop in the demand for its products, a rise in the prices of its inputs, ineffective management or a general inability to effectively compete with other lower cost producers. Using this same type analysis, it is not difficult to envision an effective contracting action, that was not competed, for which effectiveness can be attributed to the aggressive style of management, spurred by patriotism or some other noble motivation, which leads to good quality, price and schedule, which is praised by the buyer.

That there are numerous success stories detailing the benefits of competition is not the point being disputed. In fact one of the most profound, modern day examples of the varied benefits to competition can be found in Robert W. Drewes book The Air Force And The Great Engine War. In this book, Drewes outlines in great detail, the competitive "war" which pitted General Electric and Pratt & Whitney (the former sole source developer) in head to head competition for the development of new jet engines for the Navy's F-14 Tomcat and the Air Force's F-15 Eagle. In his assessment of the program Drewes states that:

> Competition is the only sure way to get best effort.... Competition, the chance to prove itself and take business away from its rival, motivated GE to invest corporate money on the project and to work aggressively to demonstrate its superior engine capability.... Over the months of formal and informal competition GE appeared anxious to please, to satisfy customer concerns. General Electric moved quickly to prove the quality of its engines. {Ref. 18: p. 151}

Drewes goes on to state that GE's early successes in ground and test flights served to spur Pratt & Whitney to try even harder. GE was credited also with innovation and risk taking as evidenced in its warranty and provisioning proposals which greatly pleased the Air Force. According to Drewes, these benefits could not have been achieved were it not for competition. Pratt & Whitney on the other hand, fought this competition, as would any prior sole source. However, competition was able to yield from Pratt & Whitney substantial initial benefits, including offering engine

improvements earlier than the Air Force had been led to expect without competition, lower unit prices than had been previously offered, and warranty price reductions. Said Drewes: "Competition extracted from Pratt & Whitney what trust, personal cajoling and public rebukes failed to accomplish." {Ref. 18: p. 152} Drewes' book offers a fascinating and informative insight into not just the effects of competition, but into the contracting process among two defense giants vying for a significant portion of their future revenue bases and industry prestige.

Another study, published by the Defense Logistics Agency's (DLA) Operations Research and Economic Analysis Office, examined the effect of competition on the administrative leadtimes (ALT) and production leadtimes (PLT) in the procurement process at DLA. The study showed that ALT for competitively awarded contracts was found to be less overall than ALT for sole source contracts, and PLT for competitively awarded contracts was found to be significantly less than PLT of sole source contracts. The study also found that ALT and PLT were reduced for items which were broken out form sole source to competition, subsequent to the breakout.

Perhaps the most widely reported benefit in studies on the effects of competition, is that of reduced acquisition costs. The most visible and frequently reported statistics in this matter are detailed annually in each of the armed services reports to Congress on Procurement Competition.

Prepared for each fiscal year by the Competition Advocate General's Offices, these reports highlight the efforts of the services to increase their number of competitively awarded contracts, as well as a summary of the more significant programs and projects on which substantial net savings were achieved through competitive procurements.

Taking the Navy Competition Advocate General's report for Fiscal Year 1987 for example, it shows some of the following typical accomplishments:

1. Public versus private competitions continue to be conducted. Savings from submarine competitions which consisted of two submarine overhauls and two selected restricted availabilities (SRAs) were estimated at $93 million. The savings were computed as the difference between the offer of the public yard and the lowest priced private yard involved in the competition. {Ref. 19: p. III-3}

2. Aircraft training range P-4A pods were broken out and procured competitively for the first time in Fiscal Year 1987. Savings of more than $2.4 million were realized on the 1987 requirements, and an additional $4.9 million will be realized when the 1988 options are exercised. {Ref. 19: p. III-5}

3. Award to the second source for the Aegis weapons system directors and controllers resulted in savings of $3.4 million. These savings were based on the previous sole source production estimate compared to the dual source price. {Ref. 19: p. III-6}

The reports for the other services detail similar information on acquisition cost savings from competitive procurements, as well as a synopsis of the efforts to increase the number of competitively awarded procurements.

Others, such as Dr. Jacques S. Gansler of The Analytic Sciences Corporation have conducted:

> Exhaustive data analysis of prior studies and prior competitive programs which have enabled The Analytic Sciences Corporation (TASC) to develop a unique predictive methodology for assessing the potential impact of dual source procurement. This methodology is based upon applicable economic theory, and rigorous, verifiable data. {Ref. 20: p. ES-1}

In TASC's report entitled "Dual Source Procurement: An Empirical Investigation" from August 1983, Gansler gives weight to the impact of viable competitive pressure on the cost behavior of the initial producers as evidenced by changing cost improvement curve characteristics.

It became clear to the researcher, during the course of this effort however, that none of these studies espouses competition as the never failing guarantor of effective contracting actions. While each recognizes the many and varied potential benefits of competitive contracting, they all recognize that the competition decision is one which must be carefully weighed and assessed before it is introduced into a contracting action. There are many factors at work in any contracting action which impact on that contract's ultimate success in terms of overall effectiveness. It is critically important to analyze each of these factors when competition is being contemplated to preclude a less effective contract from unfolding. Presented herein is only a partial list of these factors and their importance to the decision to compete:

1. **Existence of a second source**:
   If a viable second source is not already in existence, then the competition decision will have to include set-up, start-up, training, tooling , and capital

investment costs for a newly developed second source. These considerations must be weighed against the initial goal for competing the procurement. In other words there must be a formalized cost-benefit assessment to determine if competition will meet the end need.

2. **Technical Data**:
Considerations here include the adequacy and completeness of the data needed by the second source as well as the lack of crucial information such as proprietary data, trade secrets, and other intellectual properties. Lack of sufficient data, or the need for a time consuming and thorough validation of that data may prove too costly for the task at hand. Again, these considerations must be weighed against the initial goal for competing the procurement.

3. **The program itself**:
Here the considerations include the length of the production run and the quantities involved, funding stability for the program, and the initial producer's plant capacity. If the production run is short, or excess capacity exists at the initial producer's plant, then costs of developing a second source may be high due to the reduced base over which overhead must be allocated. Split production awards may well drive up unit costs at both initial and secondary producer levels.

4. **Slope of the learning curve**:
If the demonstrated learning curve of the original producer is flat, competition may be worthy of consideration. Where steep learning is exhibited, the original producer will experience a significant competitive advantage for future awards, and if cost savings is the object of competing an award, it may be extremely difficult to justify competition.

5. **Amount and type of subcontracting**:
If the number of qualified subcontractors is limited, and the degree of reliance on them is necessarily heavy, the benefits to be realized through competitive procurement are likely to be lessened.

6. **Complexity**:
Maintenance of the data package and coordination for the engineering changes are more complicated when more than one contractor is involved in production for the system.

The above list, although by no means exhaustive, is meant to illuminate some of the critical factors which go into a sound competition decision. Failure to address and analyze the impact and significance of each of these factors can readily lead to a less effective contracting action. Put succinctly, competing a contracting action will not guarantee a more effective contracting action in every case. Competition is not the sole causal agent which produces a more effective contracting action. It is merely a process which if appropriately applied, after careful analysis of all the factors, can and will often produce a more effective contracting action.

G. SUMMARY

This chapter evaluated candidate principle #2 in terms of the four criterion of the Hunt Model for Laws and Lawlike Statements. The candidate principle appeared to meet the Hunt Model's first criterion of being a generalized conditional which stated the association of two phenomenon in the form of an "if-then" statement. Criterion two, which requires all laws and lawlike statements to have empirical content was determined to be unmet by way of immeasurability. A lack of precision and measurability of the terms "effective" and "possible" make it difficult to empirically test this hypothesis. Criterion three for nomic necessity was determined to have not been met because the association of competition and effective contracting was not deemed

invariable. This was borne out by the use of the counterfactual hypothesis. Finally, criterion four; systematic integration was deemed unmet because of the lack of a currently defined and accepted contracting body of knowledge. The chapter concluded with some independent analysis (aside from the Hunt Model) of competition in the contracting process. The researcher attempted to analyze competition in terms of how it is viewed by the practitioners of the contracting process. In doing so it was stated that there is a cautionary camp within the contracting community which believes competition as a whole, can produce some very beneficial effects on the contract itself, but these benefits may never come to fruition in the given contract if several factors, impacting on the effectiveness of the competition aren't carefully analyzed and weighed.

Given that candidate principle #2 as written, fails to meet all four Hunt Model criteria, the researcher would propose re-writing the candidate principle to state: <u>If competition is inappropriately applied or withheld from a contracting action, then a less acceptable contract will result.</u> This restatement overcomes the problems of the original candidate principle in that it removes the conditional probability and states that less acceptable contracting actions <u>will</u> result. This enhances the empirical content of the hypothesis and more clearly satisfies this Hunt Model criterion. This restatement also enhances the

nomic necessity of the association in that it narrows the concept of competition to two particular cases--that of inappropriate application and that of improper withholding. In the opinion of the researcher, the restated candidate principle more closely fulfills the Hunt Model criteria, and would more likely attain consensus confirmation from the professional contracting community.

V. THE SURVEY

A. INTRODUCTION

The preceding chapter applied the Hunt Model to Candidate Principle #2 in an effort to rigorously analyze and determine its validity as a law or principle. As stated in Chapter II, all five of the candidate principles were to be exposed to a group of recognized experts within the contracting discipline in an effort to obtain some consensus from the community as to their validity. To this end, 223 surveys were sent out to these recognized experts. The survey group consisted of 193 National Contract Management Association (NCMA) Fellows and 30 faculty members at major universities offering either undergraduate or graduate degrees in the Acquisition and Contracts Management discipline. Of the 223 surveys sent out, 111 responses were received for a return rate of approximately fifty percent.

The survey, a sample of which can be found in Appendix A, asked that each respondent analyze the five candidate principles in terms of the four criterion of the Hunt Model for laws and lawlike statements. An abbreviated outline of the model was provided in each survey for familiarization purposes. Following the model outline were each of the five candidate principles. For each candidate principle, several definitions were provided to ensure that each respondent had

a clear understanding of the various terms and phrases contained within. These definitions were a combination of those of Park and the researcher. Given the candidate principle and the corresponding definitions, each respondent was then asked the question: "Is this a valid principle?" Additionally each respondent was asked to provide substantive comment on whether or not their "yes" or "no" response (as to the principle's validity) was at all tempered by the wording of the candidate principle. Respondents were encouraged to provide altered wording or phrasing if such changes would more clearly describe the invariable association between the phenomena. As a result the researcher was not able to categorize all responses into simple "yes" or "no" categories. Responses were grouped into one of five categories based on the following criteria:

1. **Group 1 (Firm Yes)**: In this category were "yes" responses with no comment, and "yes" responses with supporting comment, typically of an exemplary nature.

2. **Group Two (Qualified Yes)**: In this category were "yes" responses which were conditional based on a recommended change of terms, or assumptions that the respondent was making.

3. **Group Three (Yes & No)**: In this category were responses which fit into the "maybe it's valid" and "maybe it's not valid." If a respondent felt the candidate was a principle, but not for meeting Hunt Model criterion, his/her response was placed in this category.

4. **Group Four (Firm No)**: In this category were "no" responses which lacked any further comment, and "no" responses which contained supporting comment, often of an exemplary nature.

5. **Group Five (Qualified No)**: In this category were responses which stated general disagreement with the candidate principle, yet there was some recognition that the principle could be valid under certain circumstances. Respondents who answered "no", but indicated they might later support the candidate principle if wording or definitional changes were made, were placed in this category.

The remainder of this chapter will analyze and correlate the responses to the validity of the five candidate principles. For ease of reading, the researcher has chosen to restate the principle and its accompanying definitions before analyzing the survey responses.

B. CANDIDATE PRINCIPLE 1

1. Candidate Principle 1: If the environment and assumptions on which a contract is negotiated are varied, then the contract process and effectiveness will change.

2. Definitions:

   a. Environment: includes such elements as the economic outlook for the industry of the seller, the urgency of need of the buyer, current market conditions, the presence or absence of competition, etc.

   b. Assumptions: includes the buyer and seller's assumptions on the feasibility of the effort, perceived needs of one another, the perceived equity of the negotiation process, etc.

   c. Effectiveness: defined in terms of receiving a good or service of an acceptable quality, at a reasonable price, which is delivered in a timely fashion.

Table 1 below, details the responses to Candidate Principle Number 1.

TABLE I
Responses To Candidate Principle #1

GROUP	No. of Responses	Percent
I. Firm yes	44	39.64
II. Qualified yes	26	23.42
III. Yes and no	04	3.60
IV. Firm no	23	20.72
V. Qualified no	14	12.62
TOTALS	**111**	**100.00**

As can be seen from the above data, over 60% of the survey respondents found candidate principle #1 to be either a valid principle or one which with minor wording/definitional changes could be considered a valid principle. Analyzing the data through the five groupings and collating responses, the results appeared thusly:

1. Group I (Firm Yes)

In this group were many who felt that the candidate principle was self evident. A recurring theme was that if underlying conditions change (e.g. assumptions and environment) then so will contract effectiveness and contract process. Several respondents pointed out that there are many different contract types (22, per one respondent) drawn up merely to accommodate the different assumptions and environments surrounding any given contract. Examples provided included those which theorized a negotiation session for an item thought to be highly complex and pushing the

technological state of the art. Yet as the negotiation process continued, a breakthrough of some sort is discovered which shows the process to be more feasible than originally thought. This would generally lower risk for the contractor and change the contracting process from one of little or no shared risk by the contractor to one of his carrying a greater or equal share of the risk.

Many respondents of this group felt that the environment had a greater impact on the buyer and sellers' positions, than did assumptions. These respondents felt that the environment would largely define the needs of the buyer and seller. Needs were said to be a driving factor in the contract process and effectiveness. Examples included the "needy" seller who has excess capacity or a small business base which he is trying to expand. This hungry seller was portrayed as one who would perform more effectively and efficiently, in an effort to win new business, and perhaps gain a favored supplier status. The needy customer on the other hand was portrayed as one who would willingly pay in more ways than one to have a firm commitment for the delivery of certain goods or services. This type buyer was seen as someone readily taken advantage of by a less than scrupulous supplier.

Others felt that the contracting process itself was highly dependent on the content and force of external conditions (e.g., the environment). The environmental

factors offered up which most frequently impacted on the contract's process and effectiveness were economic, technological, political, legal, social, and ecological. Competition as an ingredient of the environment was also touted by this group as a factor which would ultimately effect the contracting process and effectiveness. It was interesting to note that none of the respondents in this first group for candidate principle #1 elaborated on why they felt each of the Hunt Model criteria had been met.

2. Group II (Qualified Yes)

The majority of the respondents in this category felt that while assumptions may well vary in the negotiation process, there is not necessarily a corresponding variance in the effectiveness of that contract. Respondents typically felt that the contracting process needed to be tailored to the environment in which the contract was being drafted and negotiated, but did not believe that the environment always impacted on the effectiveness of the resulting agreement. Grouped with this contingent were a small number of respondents who would more readily support the candidate principle if it were restated to say that the contract process and effectiveness may change vice will change. Several respondents indicated that the definition for environment should have included some reference to the Federal Government's somewhat unique contracting environment. These respondents felt that the definition failed to

recognize the need for compliance with often conflicting socioeconomic objectives and related laws that regulate those procurements. In the same vein, there were some who felt that public perceptions, as relayed to Congress, play a major role in shaping the environment in which these acquisitions take place. One respondent recommended changing the definition of effectiveness by adding a caveat after "....in a timely fashion" which acknowledged the need to comply fully with all laws, regulations and prescribed procedures. Here again was a recognition of the important role the Congress plays in shaping the contracting environment.

3. Group III (Yes & No)

This small group of four respondents had quite varying rationale for their answers. One respondent felt that but for the urgency of need of the buyer, the environment had little or no impact on the contracting process or effectiveness. Another felt this principle to be valid only under certain circumstances, such as with smaller contracts, however this respondent felt that the principle rarely held in the arena of major weapons system contracting. One other respondent felt that if variations were reflected in formal changes to the contract then the principle was valid, but if variations applied to the general environment, that would have little relevancy to one contract, then this would not be a valid principle.

4. Group IV (Firm No)

The majority of the responses in this category were supported with comments very similar to those of the GROUP II respondents. That is to say, the respondents felt that the environment and assumptions might well vary, but that did not necessarily predicate change in the contracting process or effectiveness. This majority group felt very strongly that a clear and well-written contract would have taken these factors (environment and assumptions) into account and would therefore, being the legally binding document that it is, preclude any changes in the process or effectiveness. The contract aside, several felt that the effectiveness would not change for other reasons such as the professionalism of the individuals involved, personal traits or political considerations. One individual stated it best by saying that people and organizations perform contracts because they feel obligated to, even if circumstances change, making performance less to their advantage. It was a matter of people doing what was reasonably expected of them.

There were several individuals within this group who pointed up certain failures of this candidate principle against the Hunt Model. Four felt that nomic necessity was lacking in that the candidate principle was so broad and the human element in contract negotiations so uncertain, that the invariable association between environment and assumptions and contract process and effectiveness could not be borne

out. Others took this same human element that so profoundly shapes the environment and assumptions, and challenged whether the empirical content could ever be effectively measured for its impact.

Several respondents questioned the cause and effect relationship indicated in this candidate principle given that the contract is rarely performed or administered by the same group of people who negotiated it. Finally within this group were two responses which emphatically challenged the validity of this candidate principle. The first response stated that candidate principle #1 was not a law because a law would describe the change (in contract process and effectiveness) and how it could be measured. This individual went on to state that the candidate principle did not define the degree of variation (in environment and assumptions) and could not define it because it was not fixed. The second response indicated that the candidate principle was flawed in at least two material aspects--that the contracting process is established by law and regulation and is little influenced by assumptions of the contracting parties or environment, and that effective contract performance is possible even after the worst of negotiation conditions.

5. Group V (Qualified No)

There were two broad categories of responses in this group. One category called for a change in wording to say that these factors may change the contract process and

effectiveness vice will change, and those that could not support a firm yes or no response until further clarification was given for key terms. Of this later category many of the respondents were looking for a definition of "contract process" which was not provided. Many questioned whether the term "contract process" was meant to convey contract performance. Others wondered if the term "are varied" was meant to convey the diversity of assumptions and environment or whether it meant were actually altered. Five respondents were willing to support this principle if the word effectiveness was dropped, so that the only changed variable would then be the contract process. One individual took issue with this candidate principle based on his perception that effectiveness was defined only from the buyer's viewpoint and not the seller's.

C. CANDIDATE PRINCIPLE 2

1. Candidate Principle 2: If competition within a contracting action is missing, then a less effective contracting action is possible.

2. Definitions:

   a. Competition: competition based on cost, quality, technical approach, facilities capital employed, and management effectiveness, etc.

   b. Less Effective: more prone to schedule slippage, cost growth, and a greater contract administrative burden to the buyer.

Table 2 below, details the responses to Candidate Principle 2.

TABLE 2
Responses To Candidate Principle #2

GROUP	No. of Responses	Percent
I. Firm yes	20	18.00
II. Qualified yes	22	19.82
III. Yes and no	09	8.12
IV. Firm no	49	44.14
V. Qualified no	11	9.92
TOTALS	**111**	**100.00**

As can be seen from the above breakdown of responses, over 50% of the respondents felt that candidate principle #2 was invalid or qualified their negative response to its validity. Analyzing the data through the five groupings, and collating the responses, the results appeared thusly:

1. Group I (Firm Yes):

The overwhelming majority of responses in this group were supported by a strong belief that competition serves as a very strong motivating factor for any contractor. Competition was cited as being a great incentive for the seller to satisfy the buyer. Its presence was cited as the main impetus for keeping a contract on schedule, and within originally agreed upon cost parameters. Several respondents took a rather cynical view (perhaps tainted by their own experiences) that a sole or single source contractor would always try to take advantage of his buyer. Three respondents

offered up examples of this type behavior saying that sole source contractors are prone to overestimate costs, will frequently change their technical data to protect their position, and are generally less responsive when they see themselves as sitting in the driver's seat. All of these types of behavior were said to lead to a less effective contracting action.

Other respondents simply felt that this candidate principle was a truism in any arena be it business, sports or life in general. To these respondents, competition always affects performance. In other cases it was simply stated that in a competitive environment, the incumbent contractor will do his utmost to manage a program well, to ensure he is given consideration in the next procurement.

2. Group II (Qualified Yes):

In categorizing this response group, one would have to say that the overwhelming majority of respondents felt that the candidate principle was too weakly stated. Nine of the twenty-two respondents felt that the candidate principle should be reworded to state that without competition a less effective contracting action was probable or likely, rather than merely being possible. In fact four of the qualified yes responses were provided not because of any strong belief in the principle, but rather under the assumption that anything is possible.

Over half the respondents in this group felt the candidate principle to be fundamentally true, but were quick to caution that competition is not an absolute. They made it clear that there are times when sole source contracting is both appropriate and effective. This same group also had a healthy respect for the pitfalls of price competition, and its oft cited low bidder horror stories. One of the qualified yes respondents stated that the ethical practices and integrity of the supplier played as significant a role as competition in the effectiveness of the contracting action.

Five of the respondents had difficulty supporting the candidate principle fully because of the definition provided for "less effective". This group failed to see any direct correlation between the lack of competition and schedule slippage or increased administrative burdens. What they offered in terms of additions to this definition were factors such as conditions of compliance being less, price being greater, and general responsiveness being less.

Lastly, there were three respondents who felt that this candidate principle was valid only in the pre-award stage where negotiations become prolonged because the sole source producer perceives no threat, such as not receiving the contract. They felt the principle did not hold in the post award stage, because this same contractor then became a sole source producer. At this stage it was felt that the company's technical and contract management teams would

determine the effectiveness of future contract actions, rather than the presence of competition. The thought here was that once a contract had been executed, competition was not a factor regarding its effectiveness.

3. Group III (Yes & No):

Responses in this category showed no clear trend. One of the respondents stated that the candidate principle was generally true, but cited low bidder horror stories as examples of where competition is less effective and perhaps even inappropriate. One respondent said the principle's validity depended on the phase of the contract. He felt the statement was valid only if it restricted itself to the design and development stages, and only then would it play an important part in the contract effectiveness. Another respondent felt that management oversight capability of the customer plays as important a part in effective contracting actions as does competition. One individual felt that there was always competition, even in a sole source environment. He cited the internal competition for program funding, manpower resources, facilities, etc. as being equally viable catalysts for effective contracting actions. Another individual felt that this principle would not always hold true, especially in the case of a contractor motivated to liquidate an overstocked product line, or one with a financial crisis on his hands, in which minimizing losses or meeting required money outlays would be more critical in the

short run than making a profit. One respondent felt that the principle was true some of the time. He stated that competition for its own sake can be a sham, particularly if there is an organization pre-eminently qualified to provide the required good or service. And finally, one of the respondents stated that less effective contracting actions do not necessarily follow. He felt that it depended on the technical risk associated with the type of product being acquired for a given market structure.

4. Group IV (Firm No):

Of the 49 respondents in this group, over half of them stated something to the effect that competition was no panacea, that it was not the sine qua non of effective contracting. All of these individuals cited specific examples where competition would or did prove less effective in the long run. By the same token, they were quick to point out that sole source did not always mean less effective. Five of the respondents made the case that in a situation of fierce competition for contracts, there may be a tendency for the seller to take on aggressive cost and schedule risks, which make for later performance and effectiveness problems.

Several respondents made the distinction that competition is strictly a pre-award activity. Their thoughts were that competition in this phase would probably obtain a better contract in terms of cost schedule and performance, but that cost growth, schedule slippage and increased

administrative burdens were post award phenomena, where competition is not a factor. One respondent testified that he had been party to many competitive contracts where promises made at pre-award bore no resemblance to the post-award performance. Two individuals felt that if competition were not present, then the negotiations would more likely be representative of what the actual costs and schedule would be. Six individuals felt that the integrity, responsibility and business ethics of the supplier would have far greater impact on the effectiveness of the contracting action, than the presence or absence of competition. Three other respondents felt this not to be a valid principle from the standpoint that use of the word "possible" allows one to state the candidate principle in opposing ways with equal validity. For example it would be equally correct or valid to say that a more effective contracting action is **possible** when competition is missing. And finally, four individuals expressed the opinion that there is no direct cause and effect relationship between effective contracting actions and competition.

5. Group V (Qualified No):

Again here, over half (7 of 11) responses indicated discomfort with the use of the word "possible". These individuals felt "possible" lessened the utility of the statement and didn't fit the nomic necessity criteria. If

effective contracting actions are only possible, then the thought is that invariable associations are disproved.

Aside from this factor, there were only two other qualifications provided from the respondents. The first dealt with the definition of "less effective." Two respondents felt that "less effective" should not include a reference to being more prone to schedule slippage. In their opinion, competition had little or no bearing on schedule. The second qualification, supported by two respondents, was that the candidate principle should be revised to redefine competition, as responsible and appropriate competition. This revision would support their contention that the decision to compete a contract should be carefully weighed against all relevant factors before it is applied. A decision not to compete may well result and be perfectly valid according to these two respondents.

D. CANDIDATE PRINCIPLE 3

1. Candidate Principle 3: If a non-standard item, is substituted for a standard item, then the price of the end product will change.

2. Definitions:

   a. Non-standard item: includes such elements as; driven by the buyer's unique requirements; it's demand is a function of the technology offered by the seller; model design usually unstable and undergoing revision; typically burdened with buyer's specifications, etc.

   b. Standard item: an item of relatively stable design for which the buyer has a wider variety of sources. Model changes affect demand, but basic utility of the item changes slowly. Adequate

competition and substitutes are available. Buyer accepts design and function as is.

Table 3 below, details the responses to Candidate Principle #3.

TABLE 3
Responses to Candidate Principle #3

GROUP	No. of Responses	Percent
I. Firm yes	38	34.23
II. Qualified yes	21	18.92
III. Yes and no	11	9.92
IV. Firm no	35	31.53
V. Qualified no	06	5.40
TOTALS	**111**	**100.00**

As can be seen from the above response totals, there was an even split between the firm yes group and the firm no group. What was interesting to note about this candidate principle is that approximately one-quarter of the respondents read into the statement that the price of the end product would rise vice change. Analyzing the data through the five groupings and collating the responses, the results appeared thusly:

1. Group I (Firm Yes):

Of this group of 38 respondents, slightly less than half felt that substitution of a non-standard item for a standard item would raise the price of the end item. In support of this stand, the respondents offered such factors as special tooling costs, limited production runs, non-recurring engineering costs, and

basic costs associated with any change or modification, as being the driving factors. Additionally there were a small number of respondents who stated that increased costs would be borne out in other factors such as systems compatibility, interchangability, maintainability, repairability, and spares provisioning.

Over half the respondents in this group felt that the price of the end item could go up or down. They cited economic order quantities, contract type, and whether the substitution was buyer or seller initiated as being the key indicators of whether the end item price would rise or fall.

Several of the respondents took the rather pessimistic view that change always costs money, and that whether accurate or not, a contractor faced with processing such substitution will provide mounds of data to justify the price increase. One individual felt that it could be logically presumed that if a non-standard item were the result of something proprietary or unique, and available from only one source, then the seller would presume it to be worth more, and demand a higher price than that paid for a more commonly available item.

2. Group II (Qualified Yes):

Among this group of respondents varied rationale was given for not fully supporting the candidate principle. However most of the respondents, while agreeing that price would change, felt that there were larger concerns than just price that had to be factored into any decision to substitute a non-standard part for a standard part. Many in this group felt that non-standard

items could be used where it was reasonable, and that there should be a balance of price and need in that decision. Others felt that price was a secondary consideration to form, fit and function of the non-standard part. Most of the respondents in this particular group alluded to the desirability of performing some sort of cost-benefit analysis or value study before making this substitution decision.

Four individuals stated that they could more readily support the candidate principle if it were reworded to indicate that price would rise or was likely to rise. Four other individuals qualified there support by saying that there could be offsets which would allow the price to remain the same. The remaining respondents in this group admitted that there might be exceptions to this candidate principle, but in the long run (life cycle) retention of standard parts as integral to any system would prove the least costly alternative.

3. Group III (Yes & No):

All eleven responses in this category were variations on the theme "maybe it will change and maybe it won't." None of these respondents were willing to support the invariable association of part substitution and price change. Two individuals argued that costs may always vary with this type substitution, but price would not necessarily have to vary. They felt any price change would be dependent on the contractor's cost structure, the contract type, the complexity and extent of the

substitution, and the value that substitution adds to the end product.

4. Group IV (Firm No):

Two categories of responses emerged from this group--those that felt the principle to be more of what Hunt calls the purely analytic statement and those that felt price change was not necessarily a product of item substitution. Those that looked at candidate principle #3 as a purely analytic statement were bothered by the fact that it did not address the direction of the price change. For this reason, they felt the hypothesis to be of little or no value. The second category of respondents could not support this candidate principle based on the fact that it addressed price change and not cost change. While most agreed that any substitution, save for identical items would change costs, none agreed that this would necessarily lead to a price change. Price was deemed to be a product of many more factors than just cost, thus the invariable association was not borne out.

As with Group III, there were a number of firm no responses that were justified mainly on the basis that price change was not the inevitable result of non-standard for standard product substitution. The possibility of offsets were offered as proof of this conclusion.

5. Group V (Qualified No):

Among this group of respondents were three individuals calling for a rewording of the hypothesis to reflect the fact

that price may change vice will change. One respondent was willing to support the validity of the candidate principle if cost were substituted for the word price. Another two respondents suggested their responses would change to firm yes' if the conditional were to state that price would increase.

Finally there was one respondent who felt it was trite to concern oneself with whether the price of the end product would change. He felt that if a buyer's needs dictated the use of a non-standard item, then he was left with the consequences. Were flexibility a choice, then a tradeoff would be the issue according to this respondent.

E. CANDIDATE PRINCIPLE 4

1. Candidate Principle 4: If the mix of factors determining the price of a product are altered, then the final price will change.

2. Definitions:

   a. Factors: includes such elements as the market place forces, market demand, cost, and negotiation effectiveness, etc.

Table 4, on the following page, details the responses to Candidate Principle 4.

As can be seen from Table 4, almost 60% of the respondents fully supported or gave their qualified support to this candidate principle. Analyzing the data through the five groupings and collating responses, the results appeared thusly:

1. Group I (Firm Yes):

The overwhelming majority of respondents in this group felt this principle to be self-evident--a truism. Many likened

TABLE 4
Responses To Candidate Principle #4

GROUP	No. of Responses	Percent
I. Firm yes	42	37.84
II. Qualified yes	24	21.62
III. Yes and no	06	5.40
IV. Firm no	32	28.83
V. Qualified no	07	6.31
TOTALS	**111**	**100.00**

it to laws of economics which address the impact of such factors as supply, demand, and availability of resources in determining the final price of the good or service. Perhaps this Group's opinions are best summed up by the respondent who stated that any time you vary the elements of a proposal that affect time, cost, need, risk or availability of materials, it is a given that the final price will change.

2. Group II (Qualified Yes):

Within this group were a majority of respondents who felt that the candidate principle did not allow for the possibility of offsets. Although each professed a belief that the likelihood of offsets was small, there was a concern that the principle was too absolute. As a result, there were many recommended changes to the wording of the hypothesis that would have it read "final price is likely to/may change".

Three respondents felt that the hypothesis was rather simplistic (one calling it a silly statement), and stated that

while it was probably true, they questioned its value as a principle. They were unable to see how it would contribute to furtherment of a contracting science or how it might be of value to the practitioner.

3. Group III (Yes & No):

Within this group of six respondents, one half either could not firmly support or oppose the candidate principle because it did not allow for the possibility of offsets, which would allow the price of the end product to remain unchanged. One respondent stood on this neutral ground because of the researcher's use of the words "factors determining the price." Her objection was that the condition defined the result, in other words, using "determining the price of a product" in the condition, means that "it", (however defined) will affect the final price. Finally, one of the respondents felt that uncertainty and risk were inherent elements in the contract negotiation process, and that it would be unreasonable to assume prices should change as risk factors and assumptions are resolved over the period of contract performance. This individual did however feel that the principle would have merit in the development of a pre-negotiation position.

4. Group IV (Firm No):

Fourteen of the thirty-two responses in this group were related to the idea that offsets could occur, and thus the alteration of the mix of factors would not impact on the final price of the end product. Several respondents took issue with

the definition for factors, claiming that market place forces and market demand related to open market competition and not to negotiated procurements. Two respondents stated that the principle was not valid because Hunt's criterion for empirical content, nomic necessity and systematic integration were not satisfied. No further comment was provided on those responses. One respondent questioned the semantics of the candidate principle by asking how the final price could change if it were indeed "final?" Lastly, one respondent indicated that they could support the candidate principle if it were changed to say that the final price would rise.

5. Group V (Qualified No):

All of the seven respondents in this category were willing to accept a modified hypothesis that indicated a price change may occur or was likely, rather than an absolute. All felt that there could be offsets or other compensating changes which would allow the final price to remain unchanged. One respondent qualified his response by adding that it depended on the materiality of the change in the mix of factors, as to whether price would change.

F. CANDIDATE PRINCIPLE 5

1. Candidate Principle 5: If the motivations of a party to a contract are altered, then contractual behavior will change.

2. Definitions:

a. Motivations: includes such elements as the needs and objectives of the parties to the contract, and how these needs and objectives interact.

b. Contractual behavior: the relationship, in terms of such elements as performance, communication, cooperation, and flexibility of the two parties, throughout the life of the contract.

Table 5 below, details the responses to Candidate Principle 5.

TABLE 5
Responses To Candidate Principle #5

GROUP	No. of Responses	Percent
I. Firm yes	66	59.46
II. Qualified yes	10	9.00
III. Yes and no	08	7.21
IV. Firm no	23	20.72
V. Qualified no	04	3.61
TOTALS	**111**	**100.00**

Judging by the above tabulations, one would have to say that of the five candidate principles, number 5 seems to hold the most promise for widespread acceptance within the contracting community. Roughly 68% of the respondents felt that this principle was indeed valid or close to being valid in terms of the Hunt Model. Analyzing the data through the five groupings and collating responses, presented results thusly:

1. Group I (Firm Yes):

The largest number of respondents in this group supported the candidate principle based on the fact that motivations, as defined by needs and objectives of the contracting parties, were considered as prime movers of contractual behavior. Many of the

respondents felt that this was a truism which had much wider application than just within the confines of contracting. Several individuals in this category offered examples of changes in the contracting environment which would directly impact motivations of the two parties, and thus effect contractual behavior. For example, one respondent stated that if a contractor's need for business increases, because of environmental factors, he may become more motivated to better satisfy the customer's requirements. At the same time, if he takes on a contract only to fill his capacity, and then business picks up, he may become less motivated to satisfy all of the requirements of that contract.

Nearly all of the respondents in this group agreed that needs and objectives of the two parties would greatly impact the relationship of the parties in terms of communication, cooperation and flexibility. While several respondents admitted that final service, or product rendered (contracted for) may not perceptibly change, the way in which the objectives of that contract are fulfilled (contractual behavior) probably will. Six respondents made specific note of the fact that by defining contractual behavior in terms of the life of the contract, allowed them to more readily support this candidate principle.

2. Group II (Qualified Yes):

There were no clear trends in this group of responses. Concern was expressed by two individuals as to the broadness of the definition of contractual behavior, and two more respondents

wanted a more precise explanation of what was meant by "contracting parties." These two individuals stated that a contractor and a buying agency were composed of multiple individuals with conflicting motivations. They felt the definition of "contracting party" failed to specify whether this applied to individuals, organizations or negotiating teams.

One respondent felt that while contractual behavior would probably change, it was still incumbent on the two parties to strive to fulfill the terms and conditions of the contract. Finally one respondent agreed with the principle, but doubted that it could be quantified or predicted to any great degree.

3. Group III (Yes & No):

This neutral group consisted mainly of respondents who felt the candidate principle too restrictive in that it did not acknowledge the many other factors besides motivation which impact on contractual behavior. Three respondents in this group felt motives could change while compliance (a form of contractual behavior) could remain the same. One individual felt that changing contractual behavior would only result from very strong and overriding motivations which had been altered. Another individual was again concerned with defining the contracting "parties." His argument was that what might motivate the company's negotiator and alter his behavior, may have no bearing on what motivates those within the corporate structure and their behavior.

4. Group IV (Firm No):

There were two strong opinions emerging from this group of respondents. There were those who felt that while motivations of the contracting parties may change, it was in no way logical to assume that contractual behavior would also change as a result. The second group expanded on this theme by pointing out that the contract itself was a legally binding agreement, which is designed in part to protect both parties by filtering out or moderating these changes in behavior. It was argued that contracts are entered to protect against later changes in motivation.

Three of the respondents felt that changed motivations and behavior were highly subjective factors which could not easily be measured. For this reason they felt it impossible to prove out any cause and effect relationship between altered motivations and changed behaviors. Finally, there were two respondents who could not support this principle because they felt there were many more important factors which impacted contractual behavior, other than motivations.

5. Group V (Qualified No):

Of this group of four respondents, one felt that the principle should be reworded to indicate that contractual behavior may change rather than will change. Another respondent felt that the candidate principle failed to meet Hunt's second and third criterion, but supported the hypothesis in his own mind as a valid principle. One respondent stated that changed

contractual behavior depended also on the sophistication of the contracting parties, the complexity (or simplicity) of the contract, and the stakes of the contractual agreement. The last respondent felt the candidate principle to be a useless statement because of its broadness, but offered no recommendations as to how it might be revised.

G. RESEARCHER'S ANALYSIS

Having just completed an in depth collating of the 111 responses to the five candidate principles, it is now necessary to perform some interpretation of the results to determine where the search for principles of contracting stands. From a brief glance at the five tables, it becomes readily obvious that as written and defined, none of the five candidate principles obtained a strong consensus as to its validity. Had the researcher chosen to use fewer groupings in categorizing the responses, perhaps there might have been a seemingly clearer consensus on some of the candidate principles. For example, responses could have been grouped into "yes", "no", and "maybe" categories. Such an approach, which would have lumped firm and qualified "yes" responses together, might have made the validity confirmation numbers appear more convincing. However, in the opinion of the researcher, to have changed the groupings would have ignored the important qualifications that many respondents had placed on their responses. Many of these qualifications were based on the respondents rejecting certain factors or concepts as being integral components of the invariable association of the

phenomena. Their support for the candidate principles weighed on the removal of these factors and concepts, or in some cases on their revision.

There was an additional category of qualification that revealed itself in each of the candidate principles. These were the qualifications where the respondent asked for a change in wording to indicate the probability or likelihood of the association of the phenomena, rather than their invariable association. As an example, there were many qualified responses where an individual was willing to give his/her unqualified support if the "then" portion of the hypothesis was rephrased to indicate that the factor or process may change or was likely to change, rather than stating it will change. In this instance however, the researcher felt compelled to question the usefulness of such rewording. It would appear that if the candidate principles were all rewritten to state that the "then" portion of the hypothesis might, or may follow from the "if" proposition, then we have in effect stated that the association is not invariable. Thus it would be appropriate to state that nomic necessity had not been met, and the proposition may be nothing more than a generalized conditional.

The criteria of nomic necessity for laws and principles, was perhaps the most troublesome for the five candidate principles. Scattered throughout each of the five groupings of responses, for each of the five principles were comments that indicated minor, but occasional departures from the association of the two

phenomena. For example, it was not uncommon to find a firm "yes" response where the individual went on to state that this relationship of phenomena was almost always invariably so, but, that it was conceivable, or on rare occasions possible, that the invariable association would not pan out, e.g., the "if" would not lead to the "then." Again, if there are exceptions to the invariability of the association, no matter how slight or infrequent, can it be said that nomic necessity is evident? The researcher thinks not. Not, that is, in the context of the Hunt Model, or in the context of a scientific principle. One would not after all be able to state that water may or will most likely freeze at 32 degrees fahrenheit, nor would one say that any object dropped off a 100 foot building may or will most likely fall at 32 feet per second squared. Rather, these are laws of physics, which can be repeated and produce identical results time and time again. Empirical data exists to show that the association of these two phenomena is indeed invariable.

This type discussion leads one to question the utility of formulating and hypothesizing principles of contracting. Contracting is a profession and discipline which requires the practitioner to possess many different skills and talents. The knowledge base of the typical practitioner draws from the fields of accounting, business, engineering, psychology, sociology, and law to name just a few. Yet inherent in any contracting activity be it solicitation, negotiation, award, administration or termination, there are a mix of practical and personal skills

that come into play which shape and mold that contract process. Among these personal skills are factors such as judgement, perception, intuition, and common sense which greatly impact on the practitioner's actions and results. These type factors are not readily qualified or quantified. Any time human behavior, stimulated by needs, desires, perceptions, and motives comes into play, there tends to be an inability to predict the outcome of the human actions predicated thereon. The reason for this inability to predict outcomes lies in the fact that each human being interprets and reacts to the actions of another in different ways. And different interpretations of another's actions can produce many varied responses from the recipient of the same.

The question that the above argument then begs, is whether or not absolute principles and laws of contracting should be sought. If there exists uncertainty as to whether these absolutes exist, can there then be any hope that there exist any practical laws and rules which could serve to guide the contracting practitioner in the exercise of his responsibilities? The researcher believes that the answer to this question is an emphatic yes. While these principles may not withstand the scrutiny of a Hunt Model or be susceptible to exact duplication in every instance, the researcher believes that there are "principles" which exist throughout the structure of the contracting discipline. These are not principles, which if blindly and rigidly applied will produce a predetermined set of results. Rather they are

something more akin to time worn and tested concepts which if applied with the proper mix of judgement, common sense, and careful analysis of applicability to the instant contract, will provide end results closely resembling if not duplicating those desired.

If one thing became clearly apparent during this research effort, it was that the Hunt Model for laws and lawlike statements did not allow for the many contingencies and exceptions which play so important a role in a discipline such as contracting. When human actions based on motivations, environmental factors, personal judgement, biases, and needs, are introduced into a process such as contracting, there can be no absolutes. There is no way of quantifying, or predicting at random an individual's response to a particular stimulus. Rationally speaking, it would appear that the efforts to identify contracting principles would offer more promise if those efforts concentrated on validation models which exist for the behavioral science disciplines. Given the human element which plays so heavily in the contracting process, and given that quantifying and predicting human behavior (and reaction to that behavior) is an obscure and subjective task, the contracting researcher would be well advised to incorporate and adopt those models and theories from the behavioral sciences which would better enable the contracting community to analyze, categorize, quantify and validate its inherent phenomena.

There is one other additional important factor that must be recognized as concerns the five candidate principles. While an overview of the Hunt Model was provided to each respondent, there were only 5 of the 111 responses that purposefully and recognizably analyzed the candidate principles in terms of the Hunt Model criterion. Another 12 responses made some reference within the comments as to Hunt Model criterion that were or were not fulfilled. Based on all the other supportive comment provided, the researcher concluded that individual responses were justified more from an experiential or personal perspective standpoint. This is not to say that these respondents did not use the Hunt Model in their analysis, but it would indicate that responses were heavily flavored by personal experiences and opinion. This, in turn, impacted significantly on the respondent's support of the candidate principles.

As a final comment on the validation effort for these five candidate principles, the researcher would note that such efforts were severely hampered by lack of agreement on the part of the respondents as to the definitions of terms and phrases provided. It became readily apparent that there were markedly distinct interpretations of various terms and phrases among the different respondents. The researcher would attribute much of this variation in terms as used by the public and private purchasing sectors. A larger portion of this problem, would seem attributable however, to the fact that contracting as a profession/discipline has no generally recognized or accepted

lexicon. It became apparent during this research effort, that the lack of a contracting lexicon was going to hamper this and future efforts aimed at identifying contracting principles. Until there can be an agreement on terms, and the phenomena or processes they encompass, there can be no meaningful analysis of principles purporting to explain the relationship between the same.

While any researcher would hope that his/her propositions would be evaluated against the chosen model, this did not appear to be the case with this research effort. Yet if one looks at the substantive comments provided by the different respondents, it becomes apparent that their experiential data provides one of the key elements of validation per the Hunt Model, namely that of empirical content. While it may not be necessarily documented or independently validated, each of these responses offers honest testimony to the way it is. That is to say that experiences of the respondents, if they match the causal relationships portrayed, add a certain validity to the hypotheses as presented.

What then, should be done with the candidate principles? The researcher is of the opinion that they should be reworded, redefined and rephrased to accommodate the broader consensus of opinion. That opinion which was spread throughout all of the 111 responses, provides a solid framework upon which each of the candidate principles can be restructured. If this can be achieved, then in the opinion of the researcher, the candidate principles ought to be resubmitted to the same body of experts

for further consideration and validation. As stated previously however, the researcher would recommend that a new model for validation be sought from within the behavioral science discipline.

In retrospect, the researcher would also restructure the survey itself to exclude any reference as to how such a research effort tied in with the efforts to establish a contracting science. It was this type reference that caused significant confusion and consternation among the respondents. There appears to be a large contingent of contracting professionals (25-30% by this survey) who firmly believe contracting to be an art rather than a science. To them, the effort to establish principles was foolish. Many felt that a profession so reliant upon human interaction, could never be reduced to a practical or useful set of principles. As such, it appears that many of the survey responses could have been biased from the beginning, given that the effort did not meet with this groups favor. Rather, future surveys should present the effort as an attempt to merely further contracting research, to gain a greater understanding of its processes and the interrelationship of its phenomena.

H. REVISED CANDIDATE PRINCIPLES & DEFINITIONS

Based on the analysis of all the data contained in the survey responses, the researcher would offer the following revisions to the five candidate principles.

1. Candidate Principle 1:

If the environment and assumptions on which a contract is negotiated, change to a significant degree after award, and are not addressed and resolved by the parties to that contract, then the contract process and effectiveness will change.

Definitions:

1) Environment: includes one or more of the following elements: economic outlook for the seller, capacity of the seller, urgency of need of the buyer, current market conditions, the presence or absence of competition, and any factors which effect the ability of the two parties to communicate and cooperate.

2) Assumptions: includes one or more of the following elements: assumptions on the feasibility of the effort, perceived needs of the other party, perceived equity of the contract arrangement, and perceptions of the terms, conditions and other requirements of the contract.

3) Effectiveness: defined in the buyer's terms as receiving a good or service of acceptable quality, at a fair and reasonable price, which is delivered/performed in a timely fashion. For the seller, this term equates to fair and equitable treatment by the buyer, where payments for services rendered are timely, and buyer interference/involvement in the contract is limited to that which was agreed upon in the contract.

2. Candidate Principle 2:

If competition is inappropriately applied or withheld from a contracting action, then a less acceptable contract will result.

Definitions:

1) Competition: a situation in which two or more parties vie for a particular contract where selection of the winner is based on one or more of the following elements of each proposal: cost, quality, technical approach, facilities capital employed, management effectiveness, etc.

2) Inappropriately applied/witheld: using competitive procurement when needs, timing requirements, and urgency dictate otherwise, or more simply using an inappropriate form of competition which could lead to selection of a less desirable supplier, e.g., using price competition when that opens the door to one or more known, less than reliable/reputable suppliers. Inappropriate withholding examples would include instances where a premium is paid for a given subcomponent or assembly, which is available from an alternate supplier at an equal level of quality, but lower price.

3) Less acceptable: a contract which does not meet the needs, desires, or requirements of the buying party, to the level originally expected.

3. Candidate Principle 3:

If a buyer calls for the substitution of a standard item with a non-standard item in the end product, then the cost of the end item will rise, and the price will likely rise also.

Definitions:

(The researcher would offer no revisions at this stage to the existing definitions.)

4. Candidate Principle 4:

If the factors which impact the price of a product or service change, or are altered, then the final price paid by the buyer will also change.

Definitions:

1) Factors: includes one or more of the following elements: negotiation effectiveness, cost, supply and demand, interest rates, general economic conditions, needs of both buyer and seller, etc.

5. Candidate Principle 5:

If the motivations of a party to a contract change or are altered, then the behavior of one or both parties will change.

Definitions:

1) Motivations: includes one or more of the following elements: the needs and objectives of a party to a contract including profit, quality, timeliness, reputation, cost, forward planning for follow-on contracts or subsequent buys, etc.

2) Contractual behavior: defined by the relationship of the two parties in terms of communication, cooperation, flexibility, adaptability and so forth throughout the life of the contract. It may or may not include actual performance by either of the two parties.

Having revised the candidate principles and their associated definitions, the researcher would ensure that a caveat was placed on all candidate principles indicating that the definitions were provided for clarification only, and were not meant to detail every possible outcome from the interaction of the two phenomena. Additionally, it would be made clear that the definitions provide only examples of the possible outcomes of this interaction and are not meant to convey that each would result.

I. ADDITIONAL CANDIDATE PRINCIPLES

Of the 111 respondents, thirteen offered additional candidate principles. A total of 28 additional candidate principles were put forward by this group. Fifteen of the twenty eight were presented in the form of generalized conditionals of the "if-then" type. The other thirteen candidate principles appear to stipulate an association between two or more contracting phenomena, which could easily be framed in the context of a generalized conditional. There were no clear trends among

principles offered, however, there were several principles dealing with the phenomena of negotiations, market place forces and contractual behavior among the parties, as well as the training and experience of those parties.

At first glance, these additional candidate principles would appear to suffer the same shortcomings as Park's five, when analyzed in conjunction with the Hunt Model. That is to say, nomic necessity and empirical content would be difficult to prove taking the statements as is. Some of these candidate principles lack the invariability of association simply because they refer to the possibility of an outcome rather than its probability. In other cases, it is readily apparent, that measuring the direction and degree of change caused by the interaction of the two phenomena would be difficult or impossible to objectively assess. In the opinion of the researcher, each of these additional candidate principles would require accompanying definitions for key terms and phrases, in order to minimize the varied interpretations that would likely result.

The listing of the 28 additional candidate principles is contained in Appendix C. Detailed analysis of each of these candidate principles was considered beyond the scope of this research effort. They are presented however, for consideration as potential candidates for future validation efforts. The reader should note that some of these candidate principles appear to be more generalized guidelines for contracting behavior,

rather than empirically testable and quantifiable associations of contracting phenomena.

J. SUMMARY

This chapter presented an overview of the survey used to ascertain the validity of the five candidate contracting principles developed by Park. The Hunt Model synopsis used by the respondents was presented, along with an explanation of what specific comments the respondents were asked to provide. Before analyzing the responses to each of the candidate principles, an explanation and summary of the analysis process was presented to allow the reader to understand how responses were grouped.
The chapter then took each candidate principle and repeated it just as it had appeared on the survey, along with its associated definitions. Each candidate principle was then analyzed in terms of the 111 responses received from the experts within the contracting community. The chapter ended with the researchers interpretation of the responses, and an analysis of what the data meant to the search for contracting principles. Finally, the researcher proposed revised candidate principles and definitions, based on survey results, which could be used in any future follow-on study.

VI. CONCLUSIONS & RECOMMENDATIONS

A. INTRODUCTION

Science, research, and effective contracts management are closely related in today's environment. Research, as a means of devising better plans and better decisions has gained wider acceptance in all business communities. Today's practitioner of contracts management cannot always make adequate decisions based on experiences or hunches alone. The dynamic and complex environment surrounding the profession today makes this type of decision making outdated. Contracting professionals, acting as the businessmen they are, need to make decisions based on understanding, and with knowledge of how the variables which make up the contracting process interact. Not only must they have knowledge of this interaction of variables, but there must also be an understanding of why the variables interact. With such knowledge, contracting officials can better predict the outcome of their decisions.

It is systematic research then, structured within the scientific context, that allows for the identification and definition of a set of internally consistent propositions, principles, laws, and theories which would describe man's knowledge of the contracting process. The inquiry into the phenomena of the contracting process would serve to establish

general principles by means of which those phenomena could be predicted and explained.

The need for procurement research has long been recognized and accepted. Efforts to identify and articulate principles of contracting, have been conducted and are ongoing. Contracting, if it is to be considered a science, is in something akin to its formative stages. It is a field certainly ripe with facts, observations, experiences and data surrounding the contracting process. Many hypotheses have been formulated from the concepts and constructs identified in the contracting process. In the opinion of the researcher, this is where the research process is mired. Hypotheses, which express possible explanations of causes and effects are all that the discipline has right now. Efforts must continue to identify hypotheses which will withstand some form of experimental verification. Then and only then will laws or principles be articulated. This research effort attempted just that. Five candidate principles of contracting were subjected to a form of experimental verification. While the results tended to be inconclusive, the data obtained from that experiment will greatly aid in refining and restructuring the hypothesis in such a manner as to enhance their potential for future validation.

B. CONCLUSIONS

1. Rigorous validation of Candidate Principle #2 using the Hunt Model for laws and lawlike statements showed this principle to be invalid as currently written.

Competition within a contracting action is not invariably associated with a more effective contracting action. Many factors ranging from human behavior and motivation, to the details of contract type, timing, phasing and effort impact on a given contract's effectiveness. Therefore, competition cannot be used as the sole predictive tool in discerning the effectiveness of contracts. A restatement of candidate principle #2 is provided in Chapter Four, which should more closely capture the association of the phenomena of competition and effective contracts.

2. Candidate Principle #1, while fairing second best in terms of the validity survey, suffers in the area of nomic necessity.

Validation efforts are hampered in that varied environments and assumptions may not alter the contracting process or its effectiveness if the integrated writing (contract) is assumed to have incorporated such variations, and is a legally binding document which both parties will uphold and abide by. Validity efforts were also hampered by rather narrow definitions of "environments", "assumptions" and "effectiveness."

3. Candidate Principle #2 faired last in the validity survey and suffered from a lack of invariable association among the phenomena.

Validity efforts were hampered in that the use of the word 'possible' in relating competition to less effective contracts negated the invariability of the association. It also suffered from a strong opinion among the majority, that

competition was no panacea or guarantor of effective contracting actions.

4. Candidate Principle #3, which faired fourth in the validity survey, suffered from a lack of empirical content.

Validity efforts were hampered by the candidate principle's inability to recognize that offsets due to material costs, design and technological factors could negate any price change. This candidate principle also suffered in that itchose to state that price, vice cost of the end product would change. It failed to recognize the many factors which make up the price of an end item which aren't necessarily impacted by the substitution of a non-standard for a standard item. Chapter Five discusses these problems and provides a revised candidate principle for validation.

5. Candidate Principle #4, which faired third in the validity survey, suffered as did Candidate Principle #3 from a lack of empirical content.

Validation efforts were hampered by the candidate principle's inability to recognize that offsets, attributable to a wider variety of factors could occur, allowing the final price to remain unchanged. Chapter Five addresses these problems and presents a revised candidate principle for validation.

6. Candidate Principle #5, while fairing best in the validity survey, suffered as did Candidate Principle #1 from a lack of nomic necessity.

Altered motivations were not seen to be a causal agent for changed contractual behavior, if the integrated

writing (contract) was designed and written to protect both parties by filtering out and moderating such changes in behavior. Its empirical content must also be questioned until one can come to terms with an appropriate, objective scale for measuring changes in motivation and contractual behavior. Chapter Five addresses these problems and provides a revised candidate principle for validation.

7. Contracting principle validation efforts are, and will continue to be hampered by the lack of a generally accepted contracting lexicon.

The terms and phrases used in the contracting process vary within and between the public and private procurement sectors. Until a generic lexicon is articulated and accepted it will be difficult to obtain any significant concensus on principles purporting to explain the relationship between two or more contracting phenomena. Chapter Five's analysis section deals with this particular drawback.

8. There is overwhelming support for the need to research efforts in contracting phenomena.

Regardless of whether the search for principles was supported for its scientific merit, all respondents agreed as to the need for continiung research in analyzing the contracting process and its phenomena. An overwhelming majority recognized the importance of such research in helping define and refine the contracting process for the benefit of its practitioners. The articulation and validation of principles of contracting serves that same purpose, and thus helps promote a clearer understanding of

the contracting phenomena. Appendix C, and its listing of additional candidate principles is offered as proof of this contention.

C. RECOMMENDATIONS

1. The five candidate principles, as revised by this research effort should be resubmitted for verification and validation.

These revised principles represent the collective knowledge and experience of 111 respondents who have been recognized by the professionals of their community as contracting experts. As such, it should be expected that a larger consensus will be obtained as to the validity of these candidate principles.

2. Future research efforts should look to the behavioral science disciplines for other validation models of laws and principles.

The Hunt Model appears to be too rigid to accomodate many of the behavioral aspects in contracting phenomena that sometimes make the associations less than invariable. It would appear that other behavioral science models for laws and principles might better accomodate some of these less than invariable associations, while still maintaining a great degree of predictability and explainability within the hypotheses.

3. Concurrent efforts to identify and define a contracting lexicon are sorely needed.

It became quite evident during the course of this research effort that there was no overwhelming agreement on

the definitions of the terms presented with the candidate principles. The search for candidate principles is hampered by the fact that the contracting discipline lacks any formally recognized lexicon. Data from this research effort could provide the foundation for such an undertaking.

4. Additional candidate principles should be elicited and explored beyond those provided in Appendix C.

While the number of respondents offering candidate principles was minimal, there was overwhelming support for efforts aimed at analyzing and understanding contracting phenomena. Such efforts can only lead to a greater awareness of the phenomena within the contracting process, and how they interact to produce the outcomes they produce. This information will greatly benefit future practitioners of the contracting process. As such, the articulation and validation of additional contracting principles should be undertaken with vigor.

5. Because of the discomfort expressed with establishing a contracting science, an effort should be undertaken to analyze the contracting discipline in terms of its categorization as an art or a science.

It is the researcher's opinion that an effort should be undertaken to determine where on the spectrum between art and science, contracting would fall. Additionally, it is felt that studies must be undertaken to determine whether the efforts to enhance the professionalism of the contracting workforce aren't unnecessarily limited by research efforts structured only within a scientific context.

D. ANSWERS TO RESEARCH QUESTIONS

1. Subsidiary Questions

a. What is a contracting principle, and what are its key aspects in a scientific context?

A contracting principle is a statement which explains the association of two contracting phenomena, which can be used to predict outcomes of that association. Its key aspects within the scientific context are that it is stated in the form of a generalized conditional, it has empirical content, the stated association is invariable, and the statement is well rooted within the body of contracting knowledge.

b. What is an appropriate validation process under which these candidate contracting principles can be scrutinized?

Surveys of experts still appear to be the most appropriate form of validation for principles that do not easily lend themselves to empirical testing or other scientific validation procedures. These surveys however, must be accompanied by an appropriate model against which respondents must analyze each hypothesis. The Hunt Model's appropriateness in this particular context must be questioned until it can be determined whether or not the model actually allows for slightly less than invariable associations, brought on by the human behavioral element. If the Hunt Model cannot accommodate this needed flexibility, then perhaps the validation model should be sought in the behavioral science arena.

c. Can a consensus be reached among the professional contracting community as to the viability of the candidate contracting principles?

For this effort the answer was no. Consensus was inhibited by two main factors. First, there was great concern over the invariability of any of the associated phenomena. Respondents were reluctant to agree that the candidate principles were absolutes and would always hold true. It was the element of human behavior and motivation that enters into any contracting process that kept the majority of the respondents from wholeheartedly supporting the candidate principles. Secondly, there was considerable disagreement among the respondents as to the definitions accompanying each candidate principle. It was this lack of a formally recognized and accepted lexicon that hampered efforts to obtain a clear consensus on any candidate principle.

d. Given there is a hierarchy for all generalized conditionals, laws and principles; where would these candidate principles lie on this hierarchy?

In the Hunt Model context, the researcher does not believe these candidate principles represent anything more than generalized conditionals. They are hypotheses for which there appears to be empirical evidence, but which lack nomic necessity and systematic integration into a scientific body of knowledge. These two shortcomings preclude any one candidate from being regarded as a law-like generalization. In the general context of a scientific structure, these candidate principles represent hypotheses which await

experimental verification before they can be considered as laws or principles.

2. Primary Question

a. What would result from a rigorous validation of candidate contracting principles?

This rigorous validation effort, while not producing a contracting principle, did obtain essential data and insight, that will greatly aid further efforts in this area. The validation process showed the need for a contracting lexicon, and it showed the need for incorporating a validation model which somehow rectifies the invariable association and variable human behavior dilemma. What resulted in the final analysis were refined and rephrased candidate contracting principles which should prove much more susceptible to validation by the community of contracting experts.

E. RECOMMENDATIONS FOR FURTHER RESEARCH

1. The candidate principles as rephrased/redefined should be resubmitted to the same group of contracting experts.

Given that this research effort was the first attempt to take Park's five candidate principles and expose them to a body of experts, it is considered important to attempt a second validation effort which incorporates the bulk of expert testimony, experience, and opinion. The candidate principles as rephrased should more accurately reflect the

fundamental associations of phenomena, and provide for a clearer degree of support or rejection by future respondents.

2. Efforts should be undertaken to establish the framework for a contracting lexicon.

This research effort clearly showed the need for definition and promulgation of a contracting lexicon which accurately represented the views of the majority of the community. Validation of candidate principles is hampered by the lack of such a lexicon. Future efforts to identify candidate principles will be burdened by this same difficulty. However, surveys of experts which include definitions of key terms and phrases, in actuality lay the groundwork for just such an effort. The definitions in this research effort could be easily incorporated into a larger study to identify and define the key terms and concepts within the contracting discipline.

3. The Hunt Model for laws and law-like statements needs to be re-validated in terms of its usefulness in identifying principles of contracting.

This is not to say that future research efforts should be aimed at identifying those models which support the contentions of the research. What is needed however, is a model which doesn't necessarily call for invariable associations among the phenomena of its principles. Flexibility is needed such that associations can be defined as having great likelihood of producing certain results, but with a recognition that there is a human factor which plays heavily in that association which precludes any

generalization that the association or its outcome is an absolute.

F. SUMMARY

This chapter was meant to restate the purpose of the research and its intended contribution to the furthering of the establishment of a contracting science. Major conclusions and recommendations were presented along with a brief synopsis of the areas in which the researcher felt research would prove fruitful.

The researcher recognizes that there may be gaps and shortcomings within this thesis, but it is hoped that however imperfect, it has laid some cornerstone for the identification of true principles of contracting. It is this identification and articulation which holds the key to the enhancement of contracting as a profession, and spurring further research efforts which will someday lead to useful and proven methods for all contracting practitioners to employ.

APPENDIX A

SURVEY QUESTIONNAIRE

CANDIDATE PRINCIPLES SURVEY

Underlying uniformities and regularities equate to scientific laws or principles. Shelby Hunt's model of the morphology of scientific laws identifies four criteria of a law:

1. Associations are expressed in the form of generalized conditionals, e.g., if-then type statements.

2. Laws have empirical content, e.g., supported by factual data.

3. Laws exhibit nomic necessity, e.g., an invariable association between two or more phenomenon which is not merely happenstance.

4. Laws are systematically integrated into a body of scientific knowledge. The body of knowledge refers to the collection of well defined concepts and articulated relationships, on which there is widespread agreement, that represents the present store of information and establishes the foundation for more meaningful analysis.

An hypothesis which meets all of the four above criteria is deemed a principle according to the Hunt Model. As you review the below candidate principles, I would ask that you validate them against the above model. The comments which I seek are aimed at determining whether your response is at all tempered by the wording of the candidate principles. In other words, are there changes which you would make to the terms or wording, that would sway you to more readily support the principle, or that you feel would more clearly describe the invariable associations.

Candidate Principle 1: If the environment and assumptions on which a contract is negotiated are varied, then the contract process and effectiveness will change.

DEFINITIONS:
ENVIRONMENT- includes such elements as; the economic outlook for the industry of the seller, the urgency of need of the buyer, current market conditions, the presence or absence of competition, etc.

ASSUMPTIONS- includes the buyer and seller's assumptions on the feasibility of the effort, perceived needs of one another, the perceived equity of the negotiation process, etc.

EFFECTIVENESS- defined in terms of receiving a good or service of an acceptable quality, at a reasonable price, which is delivered in a timely fashion.

Is this a valid principle?:_____. Your Comments:

Candidate Principle 2: If competition within a contracting action is missing, then a less effective contracting action is possible.

DEFINITIONS:
COMPETITION- competition based on cost, quality, technical approach, facilities capital employed, and management effectiveness, etc.

LESS EFFECTIVE- more prone to schedule slippage, cost growth, and a greater contract administrative burden to the buyer.

Is this a valid principle?:_____. Your Comments:

Candidate Principle 3: If a non-standard item, is substituted for a standard item, then the price of the end product will change.

DEFINITIONS:
NON-STANDARD ITEM: includes such elements as; driven by the buyer's unique requirements; its demand is a function of the technology offered by the seller; model design usually unstable and undergoing revision; typically burdened with buyer's specifications, etc.

STANDARD ITEM: an item of relatively stable design for which the buyer has a wider variety of sources. Model changes affect demand, but basic utility of the item changes slowly. Adequate competition and substitutes are available. Buyer accepts design and function as is.

(The above definitions were adapted from an article by Robert R. Judson entitled "A Profile of Acquisition Environments" appearing in the DEC '86 issue of **Contract Management**.)

Is this a valid principle?:_____. Your Comments:

Candidate Principle 4: If the mix of factors determining the price of a product are altered, then the final price will change.

DEFINITIONS:

FACTORS- includes such elements as the market place forces, market demand, cost, and negotiation effectiveness, etc.

Is this a valid principle?:_____. Your comments:

Candidate Principle 5: If the motivations of a party to a contract are altered, then contractual behavior will change.

DEFINITIONS:

MOTIVATIONS- includes such elements as the needs and objectives of the parties to the contract, and how these needs and objectives interact.

CONTRACTUAL BEHAVIOR- the relationship, in terms of such elements as performance, communication, cooperation, and flexibility of the two parties, throughout the life of the contract.

Is this a valid principle?:_____. Your comments:

Again, I'd like to thank you for your valuable assistance and advice. If you would like to comment further on any aspect of this research effort, or offer any additional candidate principles, please do so here.

APPENDIX B

SURVEY COVER LETTER AND INSTRUCTIONS

Dear _____,

By way of introduction, I am LCDR Stephen C. Ober, SC, U.S. Navy, a Master's Thesis student at the Naval Postgraduate School (NPS) in Monterey, CA. As a student in the Acquisition and Contracts Management curriculum, I am pursuing graduate research in an area where I hope to further the efforts to establish contracting as a profession. My research will continue the efforts of several former NPS students who sought to lay the groundwork for establishing contracting as a science, and outlining it's systematic body of knowledge. These previous efforts were also intended to strengthen the case for professionalizing the contracting discipline.

My thesis will attempt to validate one or more of five candidate contracting principles identified by LCDR Steven A. Park, in his DEC '86 Thesis entitled "The Possibility of a Contracting Science". These candidate principles were elicited from a select group of eleven recognized experts in the contracting discipline. My efforts to validate these principles are two pronged. First, each principle will be subjected to a rigorous validation through use of the Hunt model. This model, developed by Marketing Theorist Shelby Hunt, deals with the morphology of scientific laws. A premise of my research is that principles are in essence, higher order laws associated primarily with a scientific discipline. Given that premise, the Hunt model becomes a very valuable tool for assessing the elemental criteria which comprise a law. Secondly, I am exposing these candidate principles to you and 200 other experts within our community, in an effort to obtain a consensus as to their validity.

Exposure and identification of even one principle of contracting would represent a cornerstone in the establishment of a contracting science. This in turn would be beneficial to our discipline in many ways from enhancing the degree of professionalism exhibited by our contracting practitioners, and expanding the scope of contracting research by the academic community, to enhancing the understanding of the phenomena involved in the contracting process, thus improving the application of the contracting process by all practitioners and academicians.

I would deeply appreciate your assistance in this research effort, and ask that you review the attached survey sheet which lists the five candidate contracting principles. For clarity sake, I have provided definitions for some of the more nebulous terms within each candidate principle. These definitions are a combination of both LCDR Park's interpretations and my own. Additionally on this survey sheet you will find a synopsis of the Hunt model and the associated hierarchical order of laws.

As with any research effort, the researcher is always anxious to get back replies as soon as possible. A response by 15 March 1988, would be greatly appreciated. I have enclosed a pre-addressed, franked envelope for that purpose. And finally, I would ask for your frank comments on the candidate principles, as well as your thoughts on any additional candidate principles. Thanking you in advance for your kind cooperation and assistance in this effort-

Sincerely,

LCDR Stephen C. Ober
SMC# 2089
Naval Postgraduate School
Monterey, CA. 93940-5000

APPENDIX C

ADDITIONAL CANDIDATE CONTRACTING PRINCIPLES

Below are listed the additional candidate contracting principles offered by the survey respondents.

1. If accountability and reward mechanisms for contracting personnel are lacking, then an inferior contracting process and product will result.

2. If pre-contracting input by requiring personnel is deficient, then the contracting process will be prolonged and the possibility of a subpar contract output is increased.

3. The contracting officer must have training and experience commensurate with the size and complexity of the contract action.

4. His (her) role as negotiation team leader should be clearly understood by all of the members of his (her) team.

5. The requirement, once solicited should be locked in concrete to the maximum extent possible. The moving train type of requirement results in prolonged negotiations and a lack of confidence.

6. Sufficient time should be planned and programmed to enable a successful negotiation for both parties.

7. Command and corporate support should be evident- but at a distance.

8. The effectiveness of a government contract has a direct correlation to the senior management support given to the contracting officer.

9. If a program is the subject of significant public exposure, then the management influence of less well informed managers will be significant and the probability of a less effective contracting action will be increased.

10. The effectiveness of contract management is directly related to its organizational location within the business entity.

11. If competition dtermined by market research and analysis is prevalent, then more effective contracting actions result.

12. Contract terms have a great impact on competition, price and performance. The more detailed and restrictive they become, the more complicated they make the buyer-seller relationship depending on the bidder/contractor experience (or lack thereof) with the terms and conditions, lawyer concerns, and economic necessity.

13. If contractual parties are treated as team members, success is more likely.

14. Mutual trust is a prerequisite for a successful program. for a successful program.

15. Excessive oversight is expensive and counterproductive to both parties.

16. The drive to defer or save costs in the short term will result in higher costs in the long term.

17. If the quality assurance requirements of a contract being negotiated are not clearly defined and understood, then the contract process and effectiveness will change.

18. If the performance of the parties is found not to be in conformance with the provisions of any instant contract, then resolution of such differences must be made through requisite legal channels as provided by law or in the contract (e.g., arbitration, mediation, administrative review courts, etc.)

19. If the market for the item being acquired is monopolistic, then competition will_____.....

20. If the market for the item being acquired is oligopolistic, then_____.....

21. If the number of sources is constrained by (any one of the several socio-economic policy restarints, legal restraints), then_____.....

22. If the object of the acquisition pushes the state of the art then_____.....

23. If budgetary restraints act to dealy and/or stretch out production, then,_____.....

24. If premature design release causes greater than usual issuance of engineering changes, then_____.....

25. If the buyer allows extraneous objectives to operate so as to affect seller's performance, then the contract process will change.

26. If a contract is treated as a "standard contract", then the risk of non-standard consequences is increased.

27. The contracting environment will change in direct relation to the training and experience of the contracting parties (or their representatives).

28. Congress has a negative impact on the contracting environment.

LIST OF REFERENCES

1. Hempel, Carl G., Fundamentals of Concept Formation in Empirical Science, pp. 1, University of Chicago Press, 1952.

2. Fawbush, James A., Contracting Principles: A Conceptual Framework for Their Identification and Validation, Masters Thesis, Naval Postgraduate School, Monterey, California, December 1987.

3. Murdick, Robert G., Business Research: Concept and Practice, International Textbook Company, 1969.

4. Rigby, Paul H., Conceptual Foundations of Business Research, John Wiley & Sons, Inc., 1965.

5. Terry, George R., Principles of Management, 3d ed., Richard D. Irwin, Inc., 1960.

6. Parsons, Talcott, "Comment" on "Preface to Metatheoretical Framework for Sociology", American Journal of Sociology, September 1961.

7. Hunt, Shelby D., Marketing Theory: The Philosophy of Marketing Science, Richard D. Irwin, Inc., 1983.

8. Nagel, Ernest, The Structure of Science: Problems in the Logic of Scientific Explanation, Harcourt, Brace & World, Inc., 1961.

9. Park, Steven A., The Possibility of a Contracting Science, Masters Thesis, Naval Postgraduate School, Monterey, California, December 1986.

10. Sherman, Stanley N., Government Procurement Management, 2nd ed., Wordcrafters Publications, 1985.

11. Deputy Secretary of Defense Memorandum to -------, Subject: Increasing Competition in the Acquisition Process, Washington, D.C., July 27, 1987.

12. Statement of Rear Admiral Stuart Platt, Supply Corps, U.S. Navy, Competition Advocate General of The Navy before the Defense Acquisition Policy Subcommittee of The Senate Committee on Armed Services, Washington, D.C., 23 October 1985.

13. Roth, William V., Competition in The Federal Procurement Process, Hearing before the Committee on Governmental Affairs, U.S. Senate, 97th Congress on S. 2127, June 29, 1982.

14. The Competition Advocate General of The Navy, The Competition Handbook, preliminary edition, by Norman V. Brown, November 1987.

15. Kaplan, Abraham, The Conduct of Inquiry, Chandler Publishing Company, 1964.

16. Rescher, Nicholas, Scientific Explanation, The Free Press, 1970.

17. Thornton, Connie L., Contracting: A Systematic Body of Knowledge, Masters Thesis, Naval Postgraduate School, Monterey, California, December 1987.

18. Drewes, Robert W., The Air Force and the Great Engine War, National Defense University Press, 1987.

19. The Office of the Competition Advocate General of the Navy, Report to the Congress, Fiscal Year 1987, Procurement Competition, Washington, D.C., 21 December 1987.

20. The Analytic Sciences Corporation, Report EM-223-WA, Dual Source Procurement, An Empirical Investigation, by Jacques S. Gansler and Louis A. Krantz, 12 August 1983.

BIBLIOGRAPHY

Agnew, Neil McK. and Pyke, Sandra W., The Science Game: An Introduction to Research in the Behavioral Sciences, Prentice-Hall, Inc., 1969

Baily, Peter and Farmer, David, Purchasing Principles and Techniques, 3rd ed, Pitman Publishing Limited, 1978.

Barnes, Barry, Scientific Knowledge and Sociological Theory, Routledge & Kegan Paul, 1974.

Braithmaite, Richard B., Scientific Explanation, The Cambridge University Press, 1953.

Davies, J.T., The Scientific Approach, Academic Press, 1973.

Defense Logistics Agency, "The Impact of Contracting Initiatives on Lead Times", by LT Lester M. Stacy, Operations Research and Economic Analysis Office, November 1986.

Defense Logistics Agency, "Impact of Competition on Contract Delinquencies", by Eleonore Swim, Operations Research and Economic Analysis Office, June 1987.

Defense Systems Management College, Establishing Competitive Production Sources, A Handbook for Program Managers, by Louis A. Kratz, J.W. Drinnon and J.R. Hiller, August 1984.

Durkheim, Emile, The Rules of Sociological Method, 8th ed, The Free Press, 1958.

Festinger, Leon and Katz, Daniel, Research Methods in The Behavioral Sciences, Holt, Rinehart and Winston, 1966.

Heinritz, Stuart F., and Farrell, Paul V., Purchasing Principles and Applications, 5th ed, Prentice-Hall, Inc., 1971.

Jevons, W. Stanley, The Principles of Science: A Treatise on Logic and Scientific Method, Macmillan and Co., 1920.

Kuhn, Thomas S., The Essential Tension, The University of Chicago Press, 1977.

Kuhn, Thomas S., The Structure of Scientific Revolutions, 2nd ed, v.2, The University of Chicago Press, 1970.

Lastrucci, Carlo L., The Scientific Approach, Basic Principles of the Scientific Method, 2nd ed, Schenkman Publishing Company, Inc., 1967.

Poincare, Henri, The Foundations of Science, The Science Press Printing Company, 1946.

Sellers, Benjamin R., "Second Sourcing: A Way to Enhance Production Competition", Program Manager, May-June 1983.

Sellitz, Claire, Wrightsman, Lawrence S. and Cook, Stuart W., Research Methods in Social Relations, 3rd ed, Holt, Rinehart and Winston, 1976.

Smith, Charles B., A Guide to Business Research, Nelson Hall, Inc. Publishers, 1981.

Ziman, John M., Public Knowledge, The Cambridge University Press, 1968.

Ziman, John M., The Force of Knowledge, The Cambridge University Press, 1976.

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